THE MONIST

A QUARTERLY MAGAZINE

Devoted to the Philosophy of Science

Editor: DR. PAUL CARUS.

Associates: { E. C. HEGELER. MARY CARUS.

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CHICAGO

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The Open Court

... In Mustrated Montbly Magazine ...

DR. PAUL CARUS

ASSOCIATES E. C. HEGELER

Devoted to the Science of Religion, the Religion of Science, and the Extension of the Religious Parliament Idea.

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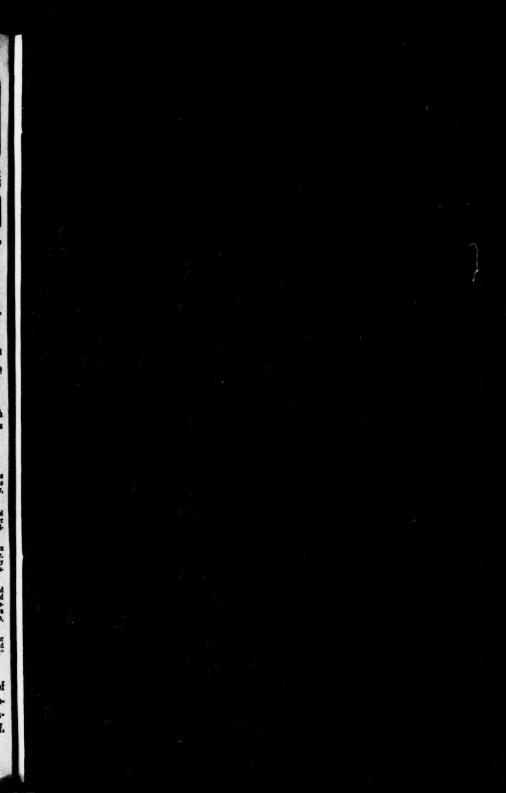
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THE MONIST

THE MODERN THEORY OF ENERGETICS.*

S INCE the middle of the last century when the comprehensive significance of the law of the conservation of energy became generally acknowledged, the conviction has also developed that this law must serve as the foundation of the natural sciences, above all of physics. The realization of this thought, however, though in itself quite obvious, has been retarded by inertia of every kind so that even to-day there is hardly a text-book on physics which seriously undertakes to work out a presentation of the several laws and relations strictly in this sense; and this requirement has been met even in a less degree in other neighboring realms of science.

So closed the nineteenth century, and its greatest discovery was not yet granted the practical recognition and significance to which it justly lays claim. In 1896 at a conference of naturalists in Luebeck I gave a hint of this obligation and necessity in a lecture on the "Triumph of Scientific Materialism" which attracted considerable attention, but could not alter the general condition of affairs. For this it would be necessary to show by means of a survey over the whole realm of science that the concept and the laws of energy really possess the power to unify and to give light which has been ascribed to them, since they direct

^{*}Translated from the German in the opening number of the Rivista di Scienza by Lydia Gillingham Robinson.

the attention of investigators to the real problems and exclude pseudo-problems from the discussion. This was done in 1902 in my "Lectures on Natural Philosophy" (Vorlesungen über Naturphilosophie).

Since that time the significance of the theory of energy, or energetics, for the general world-conception has come to the consciousness of increasingly wider circles. At any rate most philosophers and philosophizing naturalists today occupy themselves mainly with attempts to refute energetics. That these attempts are constantly renewed is an involuntary evidence that each opponent of energetics considers the onslaughts of the rest as not sufficiently deadly, and hence believes that his own attacks are needed to finish the work. More important than these attempts which are occasioned at regular intervals by mistaken conceptions of the problem, is the increasing acceptance which the fundamental ideas of energetics have found among the workers of science. The biological sciences especially begin to recognize a very efficient means of progress in the treatment of their problems which is furnished by energetics.

On the other hand, energetics coincides with that movement which has originated on philosophical ground and which pursues very similar ends under the name of "pragmatism" or "humanism." This at least makes it plain that energetics corresponds to definite requirements of the day.

In the following pages I shall not, therefore, undertake to write anew an outline of energetics itself; for this I must refer to the above mentioned writings. On the contrary, I have set myself the task to help those who have already taken the opportunity to familiarize themselves with the main issue, in finding their way among the manifold new paths of thought. In the above-mentioned objections I have found sign-posts pointing out the most serious obstacles in this direction. Indeed, this has been a real, al-

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though perhaps not contemplated, service which I have derived from those attacks. They have shown me where the hitherto customary modes of thought most impede a conversion to the newer view.

Great discoveries in natural science always bring in their train a far-reaching reform of general philosophical conceptions and modes of thought. One can easily point out the influence of the discoveries of Galileo, Kepler and Newton in the philosophy of the eighteenth and nineteenth centuries. Indeed this influence acts like a process of diffusion, that is to say, at first only those special branches of science are affected which lie nearest, and the farther away their domain, the later the influence of the new thought will be felt. Herein consists a very definite and characteristic difference between the times when the influence of a new thought is felt in the domain of the special sciences and in that of philosophy. The effect produced on philosophy is frequently not apparent until the special science has so far come to an understanding with the new conceptions that they become self-evident, that is, we no longer give them any thought.

But this reciprocal action becomes peculiarly complicated because of the following circumstance. Except in periods of unusual philosophical activity the specialist in science troubles himself but little with the elements of the universal or philosophical conceptions which he employs for the purpose of classifying his several data; and this is because they apparently do not essentially enter into the consideration of the latter. So specialized science is not only slow to adopt the corresponding thought-formations of contemporary philosophy, but even thinks little of changing them again forthwith to correspond to the modifications of philosophical conceptions. Therefore it remains as far behind philosophy as philosophy commonly remains behind science, whence arises a twofold delay in the philosophical

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components of the special sciences, which of course does not appear in technical treatises but in the introductions to text-books. So for example the venerated primary and secondary qualities of John Locke still continue to maintain rather an undisturbed existence as a philosophical pensioner in text-books on physics. In spite of the Dalton law, according to which each gas in a compound of different gases exhibits the same properties and reaction as if it alone were present in that space, although thus, in other words, the gases are said to actually penetrate each other undisturbed and uninfluenced, no text-book neglects to teach in its first chapter the impenetrability of matter as an absolutely universal principle.

These remarkable conditions must be borne in mind if one would judge correctly the position of energetics in the science and philosophy of to-day. The idea of matter as the real substratum of all natural phenomena and as endowed with weight and mass, has arisen from the paramount influence of Newton's theory of gravitation, to which at the end of the eighteenth century was added the law of the conservation of weight even in the case of chemical processes. Side by side with ponderable matter earlier science had quietly accepted imponderable matter as well, such as fire, electricity, etc. Even Lavoisier who was the first to point out clearly the remarkable significance of relations of weight in the determination of chemical processes, showed the influence of tradition by including heat and light in his table of chemical elements although he knew that they did not possess measurable weight. However, in the nineteenth century these antiquated notions disappeared completely, and the dualism of matter and force developed, in which upon matter devolved the function of substance in the Aristotelian sense while the rôle of attribute (Accidenz) was assigned to force. In this way matter became the only real thing in phenomena, and

the imponderables, heat. light and electricity, attained thereby a peculiarly false position.

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This feeling is most clearly expressed by Julius Robert Mayer in his fundamental treatise of 1842, "Remarks on the Forces of Inanimate Nature" (Bemerkungen über die Kräfte der unbelebten Natur). Mayer can not agree to the idea that forces should so come and go, now here and now gone, while only inert, lifeless matter should possess the advantage of indestructible duration; and so with conscious intent he seeks for a similar expression for that other imponderable essence which would establish its claim to a law of indestructibility. "There are two divisions of causes in nature between which no connecting link can be found experimentally. One division consists of the causes to which belong the attributes of ponderability and impenetrability, — forms of matter; the other, the causes which lack these attributes,—forces which because of their characteristic negative attribute are called also imponderables. Accordingly forces are indestructible, mutable, imponderable objects."

A desire for unity is the essential point in these declarations which as the first public presentation of Mayer's ideas contain the most direct expression of his thought. Even though Mayer can ascertain no connecting link between these two divisions he cannot make up his mind to treat them as quantities of an entirely distinct character as was customary in his time, and therefore he brings into prominence their agreements with a distinctness which even to-day acts like a thrust on those naturalists who stand for the older conception. Even to-day there are many who object to looking at force (or to give it its modern name, energy) as an *object*, and up to the very latest times remarks can be heard or read to the effect that matter is of course a reality, but that energy is not real but only thought. These propositions, to be sure, would prove even

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more than was intended. They prove that in the minds of their advocates energy is not even *thought*, for if they had considered the relation of energy to the concept of reality, they would not have made such propositions.

It is well known that Mayer greatly hindered the right appreciation of his ideas by setting himself in opposition to the customary nomenclature. There is positively no doubt that Mayer knew perfectly well that his "force" was called "work" in contemporary mechanics, (at least in one particular case; in another, to be sure, it was also called "force" in the expression "living force" or "momentum"). To those who would unjustly accuse him of a mistake in this particular he makes this pertinent remark: "As far as force is concerned, the first question is not what sort of a thing 'force' is, but rather, what thing it is that we wish to call 'force.'" If we will substitute the word "energy," which is now in general use, in the above-mentioned definition of Mayer, it will read "energies are indestructible, mutable, imponderable objects."

Here, indeed, we have the conception which has been valid for more than half a century since the discovery of the law of the conservation of energy. In this connection in addition to the just mentioned conceptions of forces the word "object" has been heard but very little. While the conservation of matter (which does not actually exist at all, for only weight and mass are conserved while everything else pertaining to "matter" is changeable) stands for something natural and self-evident so that it is usually proclaimed to be a necessity of thought, the conservation of energy appears surprising, remarkable,—at any rate as something which bespeaks our astonishment and admiration.

This is the point at which modern energetics enters. First it would be necessary to make clear the thingishness or reality of energy, in connection with Mayer's train of

thought, so that old respectable Matter ought not feel ashamed in the company of energy in spite of the latter's dubious imponderability. In the second place, however, the assumption which Mayer made without close scrutiny, that the two were absolutely separated and without any connecting link, required a more exact investigation. The conclusion, as may already be inferred from this, is a complete reversal of the relations heretofore considered valid. While energy becomes clear and more confirmed as a reality, the claims of matter disappear and matter is left without any rights except those of tradition. Matter must not only tolerate energy on an equality as the progressive textbooks of the natural sciences to-day demand, but it must even yield its place unconditionally and withdraw as a superannuated dowager upon her reservation where, surrounded by a court of adherents of the past, she may await her approaching dissolution.

We observe here in Mayer a phenomenon which in spite of its singularity belongs to the most common in the psychology of investigators. It consists in the fact that the investigator does not pursue to the end the path which he himself discovered and trod. He regularly leaves in his work a remnant of the same false or redundant conception which he undertook to remove. We have just seen in the case of Lavoisier how in spite of his discovery of the farreaching significance of gravity for the interpretation of chemical processes, especially for the determination of elements, he included in his table of elements, the essences light and heat which are without weight.

In the same way Copernicus set aside the epicycloid theory for the motion of the earth in relation to the sun while he considered the earth to be in motion and the sun stationary. Meanwhile he still clung to the epicycloids for the rest of the planets.* In the same way Mayer has at

^{*}Here Professor Ostwald may think of Tycho Brahe.-Ed.

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last recognized that ponderability is not an essential mark of the reality of a thing since he has verified *imponderable realities*. But his critique has not gone far enough to ask whether ponderability is to be assigned as important a rôle as the older theory had given it. He granted it this rôle without attempting its justification and by this means was led to his dualism.

Now it is characteristic of modern energetics that it sets aside even this dualism and installs energy as the sole universal generalization. All phenomena are reduced to properties and relations of energy, and especially matter, in so far as such a concept would at all prove useful, is to be defined in terms of energetics.

The question why or for what purpose we should or must undertake this reversal of the significance of ideas, is answered by the fact that the concept of energy as a matter of experience is proved to be broader than that of matter. When this is once discerned all discussion will naturally cease. We can not define the concept "man" by the concept "negro" but we can do the reverse. The concept of light or electricity can not be defined by the concept of matter for the former are both recognized to be immaterial objects; but both can be defined by the concept of energy, for they are kinds or factors of energy, whence it may above all be deduced that the concept of energy is indeed broader than that of matter. That even matter may be given a definition from the standpoint of energetics, —yes, even that the only clear definition of matter is that provided by energetics, will be set forth later.

Above all the new element in Mayer's train of thought was so altogether new that its "mortal coil" so painful to bear remained unnoticed. On the contrary, the work of Mayer's contemporaries and immediate successors who with him were the first to comprehend the monstrous import of the new thought, tended to attach the new knowl-

edge as closely as possible to the old traditional conceptions. Both Joule and Helmholtz advocated the mechanical theory of all natural phenomena. They saw in the transformations of energy nothing but the changes of atomistic motion, and especially Helmholtz sought an explanation for the law of the conservation of energy in the hypothesis that central forces, dependent merely on distance, were alone operative between the atoms.

In theoretical mechanics a special case of the law of conservation was known as the statement of the conservation of "living force," or momentum, which announced that when a celestial body reaches in its course a certain distance from its central body it possesses always the same velocity and therefore the same momentum or energy of motion, independent of the direction of the motion and the position of the point. In other words, if any sphere is placed around the central body of the system, the celestial body has always a definite value of its momentum when it finds itself anywhere in the plane of this sphere. The larger the radius of the sphere the smaller this momentum, and the function of distance (the potential) was also admitted which with the momentum yielded a constant difference (or a constant sum, according to the definition of the function in question).

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If we so define the potential that its sum is constant with the momentum, we then have, as we know, the particular case of the law of the conservation of energy with regard to which only two kinds of energy (i. e., momentum or kinetic energy, and energy of position or distance) are to be considered, and are mutually transformed the one into the other. A condition of this relation is that no measurable part of energy is transferred to other forms in these motions. Especially in terrestrial processes the unavoidable conversion of a portion into heat is so infinitely small that it never comes into consideration in ex-

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periments. Its existence is accepted only on the ground of the principle of continuity, but has not been the object of a direct measurement. Whenever it occurs, it remains outside the limits of our present instruments of measurement.

By virtue of a general property of our thought according to which we conceive of new facts as analogous as possible to those already known, it would now be possible to look upon this well-known and, because of its simplicity, easily comprehended and transparent relation as the norm or type for all other kinds of transformation of energy. This could happen only on the assumption that no other kinds of energy exist in the world than those which have been seen to be active in the astronomical phenomena already described. To be sure, in heat, light, electricity, etc., a large number of other kinds of energy were already recognized which without further remark might be considered as energy of motion or of position. The hypothetical supposition remains, that even in these cases only the two kinds of energy above named were really to be found, but that the corresponding motions and attractions took place between the invisible and immeasurably small atoms.

By this hypothesis, to be sure, the above mentioned psychological requirement was satisfied in a very far-reaching way, for by its means the concept of energy was simply made a component part of the mechanistic world-conception which at that time was very wide spread, and according to which everything that happens is supposed in the last analysis to depend upon the mechanical interaction of atoms. It is true that Leibnitz had already raised the pertinent objection that such an explanation would not account for psychical phenomena. For if the whole category of motions of the hypothetical brain atoms accompanying a given thought process should in any way be

made visible to us, we would see only tiny bodies in motion but not the corresponding thoughts, and the existence of the latter would remain as far from explanation as before. The weight of this objection meanwhile remained disregarded until a generation ago when Dubois Reymond raised it again and recognized it as an insurmountable barrier to the mechanistic world-conception. He was, to be sure, so convinced of the truth of the mechanistic view that he could not draw the conclusion that it was insufficient, but simply thought that here he would be compelled to note an absolute limit to the power of human intelligence. This attitude indicates the almost entirely undisputed dominion of the mechanistic conception (at least among naturalists) at the time of the discovery of the law of energy, and gives a psychological explanation for that arbitrary narrowing of the law of the conservation of energy which is now under consideration.

Another consequence of this same conception must be mentioned here, namely the division of all energy into kinetic and potential. It is directly evident that this division is one expression of the similar hypothesis that astronomical phenomena are typical for the whole category of natural phenomena. The extremely hypothetical character of this division is most obvious from the fact, for instance, that opinion is entirely divided as to whether the electric current represents kinetic or potential energy. On the ground of the kinetic hypothesis the kinetic nature of heat seems to be generally accepted, but if we ask for any objective sign by which kinetic energy is to be distinguished in these cases from potential, we receive no answer. Indeed I know of no place in literature in which this question has been even asked, much less answered. The peculiar nomenclature which originated with Rankine, even gives expression to the fact that only kinetic energy has claim to full actuality, and that energy of position is not energy

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properly so called, but something which may become energy only under certain circumstances. The logical consequence of this still continues in the contradictory combination of concepts in the term "latent" heat. If we reflect that this became necessary just because the law of the conservation of energy was still quite unknown at the end of the eighteenth century when Black introduced the term, and that the expression "latent heat" was only used to save, at least outwardly, the idea that heat can not simply disappear as it seems to do in the process of melting or conversion to steam, the result is really remarkable. The by-paths which that old thinker had to tread because the law of energy was unknown to him, were involuntarily retained after the necessity had passed with the discovery of the law of energy; for there is now no difficulty in seeing that heat must disappear when the corresponding amount of energy is used for a change of condition (i. e., melting or conversion to steam).

The error in thought which is expressed by the words "potential energy" is by no means harmless. It prevents the comprehension of other kinds of energy as just as actual as the energy of motion. This is apparently due to the very obvious fact that the motion of a body endowed with kinetic energy can be seen, and hence we are convinced of its presence without being obliged to consider any further demonstration. But we can feel the existence of heat energy, and see light, and hence it comes that we can bring all energy to act directly or indirectly upon some sense organs and so betray its existence. Indeed an energy which could not in some way influence our organs of sense would be permanently unknown to us, and so could not form any component part of our world-conception. Kinetic energy, therefore, is not more actual or real in any particular than any other kind of energy, and every energy which is transformed into another is potential with regard

to that other, which is itself actual. This is the only consistent meaning which can be ascribed to these expressions, still science has shown no necessity for a short word by which to indicate the above mentioned relation, and therefore the best we can do is to drop those misleading terms entirely.

We are directly led by these observations to the general question as to the "real." If with every scientific precaution and by avoiding all tacit hypotheses, we try to characterize our relation to the "universe" (Welt), we can say that at the beginning of our conscious life we find ourselves brought into contact with a large number of experiences between which we can discover only a very slight connection. This is most distinctly expressed in the fact that we are able to foresee so little of what will take place in our future. For foresight is the peculiar content of our understanding; the measure of foresight according to space of time and multiplicity of foreseen events, is at once the measure of our intelligence. The new-born child foresees nothing except that he will find nourishment on the reaction upon certain irritations of smell and feeling (wherein it may remain a question whether consciousness is already active) and so stands upon a very low plane of intelligence, but even the highest grade of this attribute as it may be embodied in a successful investigator, politician, or captain of industry, is exactly characterized by the fact that such a man can foresee more and farther than his opponents or competitors.

We say that we know the things which we can foresee; we feel at home with regard to them, and their foreknown spatial and temporal relations are comprehensible to us. Upon such things, so far as sense-impressions are concerned, we at the same time bestow the name of "real" things. This expression is applicable only in so far as we are dealing with things of the so-called external world.

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The "reality" of our thoughts is so self-evident to us that we give it no thought; we know that they form the primary component parts of all our conscious experiences. Dreams, hallucinations, and the like we call unreal external objects because they do not follow the rule which we have laid down according to our experience for "real" external objects, i. e., because the predictions are not usually fulfilled which we have applied to external objects from our experience with them. As soon, however, as such things are shown to be according to law and able to be foretold, they enter at once into the realm of reality. This is explained by the example of hypnotic phenomena which were considered as figments of the imagination by earlier critics and were cast aside as unreal, while to-day the character of reality is granted them through the knowledge of conditions upon which their occurrence depends and the special peculiarities with which they are regularly associated. It must still be observed that the expression "foretell" is not to be applied exclusively to those parts of a phenomenon which take place successively in time, but to those parts also which range next to each other in space. Moreover since we can not become aware of all these parts at the same time because they enter into consiousness one at a time, so to our experience each juxtaposition in space becomes also a succession in time. But space possesses the special peculiarity that this succession can enter our consciousness in arbitrary sequence if not exactly according to our choice.

In the light of these observations, it is obvious that there can be no question of unreal energy either of position or distance. If we know in general that a body above the surface of the earth can perform a definite amount of work while it approaches the surface, the sight of an elevated body affords us direct knowledge of ready energy with the same certainty as would the sight of a body in motion.

Accordingly from the standpoint of a profounder and more general contemplation of the concept of reality, the distinction between actual and potential energy becomes an untenable and even dangerous error.

How now do matters stand in regard to the reality of energy itself? Mayer, as above mentioned, has expressly asserted its reality, but his view has met with but little support. Although at one time men were very ready to recognize the justice and importance of the law of the conservation of energy, they have troubled themselves but little about the general viewpoints by which Mayer was led to his great generalization. We have previously seen that it was exactly his desire to work out the real, the substantial, in "forces," that led him to the train of thought which proved so rich in consequences. In contrast to this there are authors even in our own time, who substitute for the central significance of the concept of energy a certain anxiety to recognize energy as a substance right or wrong, and to ascribe to it at least the same degree of reality as to matter. We find again and again the statement that energy is merely an abstraction or mathematical function possessing only the particular attribute of retaining its value under all circumstances. This causes a confusion which is obvious from a special peculiarity of all European languages, and with regard to which one should be greatly on his guard since its frequent repetition shows how easily it can cause trouble. This is the linguistic custom of indicating by the same word both the general concept and the concrete thing which corresponds to that concept.

By music, for instance, we understand the general art of so arranging tones that they create an esthetic impression, as well as each particular case in which this performance is put into practice. In the same way we call energy in general that function of measurable quantities which

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possesses the property of conservation under all circumstances, as well as each particular value of this function that has been observed in nature. Obviously those who refuse reality to energy have in mind the universal concept from which in the interest of its universality every superfluous particular manifestation is omitted. In so doing they overlook the fact that the word energy denotes at the same time the concrete realization of the universal function. If a thing exists which possesses a definite numerical value that can be expressed in producible units and which can not be changed by any known process it will fulfil in the highest degree all requirements that can be made of a reality. Especially does it make possible the prediction that one may count its value the same before as after a desired operation. What scientific and technical meaning this possibility of prediction possesses it is not necessary to explain, for upon this rests all of the enormous progress which has been brought about by the discovery of the law of the conservation of energy.

Finally the reality of energy results in the most evident way from the circumstance that it possesses a marketable and commercial value. This is most clearly shown in the case of electrical energy. Here energy is consumed and paid for by the consumer, while all "material" portions of electrical apparatus are neither diminished nor altered by its use.

The confusion thus mentioned finds some excuse in the circumstance that the general concept of energy is indeed exceptionally broad and comprehensive, and with relation to its particular charcteristics permits of an almost unlimited diversity. Besides the fact that energy is an essentially positive magnitude, possessing the character of magnitude in a narrower sense (i. e., it can be added to ad libitum), and further, besides its quantitative conservation in all possible transformations, I could indeed mention no

characteristic which would be equally valid for all the different kinds of energy. This circumstance, however, has occasionally been made to count as a reason against energetics, just as if this universality were a fault or blemish of the energy-concept. Meanwhile we need reflect only a moment upon the problem to be solved in order to see that exactly this objectionable attribute is necessary for the desired purpose.

What then is the task before us? We must find a concept which is applicable to the greatest possible range of phenomena and offers the greatest possible amount of definite information about each particular case. The mechanistic philosophy sought this concept in motion, but was obliged to resort further to the concepts of mass and force in order to render possible the representation of actual phenomena; and the result for the non-mechanical (or in the sense of this hypothesis, crypto-mechanical) phenomena with reference to possible predictions was equal to zero. What conclusions had been drawn from the mechanistic hypothesis, for instance, that heat consisted of a motion of atoms? Nothing definite at all; for the kinetic hypothesis which Bernoulli evolved on the condition of gases rests upon a large number of other hypotheses, as is at once apparent from the fact that it has no application to liquid and solid states. With regard to the particular character of the supposed motions, the mechanistic hypothesis provided no direct information, and since these hypothetical motions had to have some magnitude and direction, many questions arose which had no empirical meaning, i. e., pseudo-problems (Scheinprobleme), to use a happy term of Mach's, problems of such a remarkable character that even if their solution were made possible by some supernatural powers. we would be unable to utilize it since it has no reference to observable magnitudes.

In contrast to this, the extraordinary universality of

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the concept of energy brings it about that such pseudoproblems never occur. If heat appears in any formation we can say nothing, to be sure, about the "inner nature" of this phenomenon on the strength of the principle of energy, but we can know in advance that all varieties of this heat will be parallel to corresponding variations of other similar energies whose amount we can calculate in advance from the amount of their heat variation. Further, from the particular property of heat-energy which is called temperature we can make other very characteristic predictions, but in so doing we are dealing always with measurable things and never with the unknown "heart of nature."*

This my opponents are ready to grant but they maintain that just herein lies the imperfection of energetics, while the mechanistic conceptions permit an invasion, although but hypothetical, into these mysteries. This logic is like that of a merchant who would place but little importance upon the careful computation of his assets and liabilities. and instead would set up a hypothetical account of how much property he would have under such and such circumstances. Even if he were to make his hypotheses plausible vet no one would call such an account reliable or businesslike. He may reflect upon possibilities or probabilities in order to become clear about investment in an uncertain business, just as an investigator will speculate about the probability of the unknown conditions of a domain which he wishes to investigate, that he may have some idea in what direction to begin his experiments. But the reliable merchant, like the reliable man of research, will extend such forecasting of possibilities only to those conditions which he can and will afterwards submit to demonstration, and which will then have only measurable and verifiable

^{*}This translates Goethe's well-known expression "das Innere der Natur."-Tr.

things for objects. As soon, however, as he introduces inaccessible factors into his calculation his work ceases to be reliable. We must therefore distinguish carefully such experimental assumptions of unknown relations between accessible quantities, from the hypotheses about conditions of things merely thought of and therefore inaccessible. Only the latter kind of hypotheses needs to be discarded, while the first is a necessary element of research.

In the scientific language of to-day these two fundamentally different kinds of hypotheses are called by the same name, "hypothesis." I am in favor of leaving the name hypothesis for the unverifiable assumptions, since indeed most hypotheses of the science of to-day are of this character. The other assumptions which, like a scaffolding, serve the purpose of the particular investigation on hand, and in the course of the work are replaced once or oftener according to our need by new usable assumptions until the condition sought for is actually found,-these assumptions made for the purpose of positive work, I call prototheses. A protothesis, therefore, is set up at the beginning of an investigation and disappears at its close if the work is successful; while a hypothesis is established when the work can be carried no farther. For this reason it is customary that in the production of scientific work the different prototheses which the investigator has employed are for the most part not mentioned at all, for it has been usual to communicate only those assumptions which the investigation has finally proved to be correct or at least approximate. Silence is kept with regard to the unsuccessful prototheses just as the scaffolding is removed after the building is completed. Only very rarely, as for instance in Kepler's reports of his astronomical researches, do we learn a little about the unsuccessful prototheses. On the other hand the hypotheses in the narrower sense occupy a large place in literature. Because inasmuch as they have

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reference to scientifically inaccessible things they can be neither proved nor refuted, an endless pro and con is the usual result; further, because among the problems there are also pseudo-problems which do not at all refer to demonstrable things, these problems are unsolvable and are dragged through science as unanswered questions which can not be disposed of, but not until they are recognized to be merely pseudo-problems.

It is therefore very important to have a sure method for the recognition of hypotheses in the narrower sense, and of pseudo-problems. Such a distinguishing mark has already been given in what we have just said, at least for the domain of the exact sciences. When expressions or notations of magnitudes which can not be observed and measured and for which we can substitute no definite and empirically determinable value, occur in a formula by means of which some physical relations are to be represented, we have to deal with an hypothesis. For the task of the exact sciences is to establish the reciprocal relation of measurable and demonstrable quantities, or in other words to find the mathematical forms or functions by which these quantities are interrelated, so that one of them can be calculated when the others are given. In order to establish experimentally such a functional relation it is therefore necessary to measure singly all variable or constant magnitudes which appear in such an equation. No other means is known by which to establish whether the protothetically assumed functional condition exists or not. As long as a single magnitude appears which is not susceptible to measurement, we can not consider the assumed condition as proven. Then, too, such an equation is useless, for since it expresses the condition of a magnitude which is not susceptible of measurement, it makes a statement about a thing which has no influence on, nor significance for, science or life. For not being susceptible to

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measurement is only another expression for the fact that nothing at all depends upon this thing. If anything did depend upon it this dependence would be one way to experience something about the thing, and it would be measurable.

This recipe for the discovery of pseudo-problems refers of course only to the relations of measurable quantities which can be expressed in mathematical equations. until our own time has mathematics reached the point where there are other generalizations besides quantities which permit of mathematical treatment, and the corresponding method of calculation has not yet been developed for general use. So by means of the still imperfect medium of the language we must attempt to solve the further problem of characterizing pseudo-problems in general. We shall find the way for this in an observation which has just been made. If the solution of a problem would change nothing in our conception of actual relations, it is characterized by this fact as a pseudo-problem. The recipe accordingly is as follows: Suppose the problem solved and assume any one of all possible answers to be correct, we then investigate what effect this would have on our conduct. If it produces no effect the problem is thereby indicated to be a pseudo-problem.

In order to learn the application of this prescription we may put the following question, Did the world have a beginning in time, or has it existed from all eternity? By way of experiment we will assume that it has existed since eternity, and will ask what would change in our conduct by this knowledge? I find at least for myself that nothing would change by this knowledge, and just as little if we assume that there was a beginning in time. Hence I must say that even if I positively learn in some way which of the two possibilities is correct, it would be a matter of

perfect indifference to me, and this being the case we have here a pseudo-problem.

The significance of this procedure is apparent from the answer to the question as to what we call "correct" or "true." The answer was, that which enables us to make accurate predictions. Something which does not allow us to make any prediction whatever is essentially of no interest to us in any way, and there is no need of being concerned about it.

Now if we apply these observations to energetics we will recognize the fact that we can protect ourselves successfully against pseudo-problems by formulating our questions concerning phenomena from the viewpoint of energetics. At present it may be stated without fear of objection that among the different domains of physical phenomena there is no other universal condition than that of energy. That is to say, whatever may happen physically (chemical and physiological phenomena are here always included under this term) we can state an equation every time between the energies that have disappeared and those newly arrived. There is no other physical quantity to which such a generalization would apply. Further since such a statement refers always to measurable and demonstrable things on account of the general measurableness and demonstrability of energy, therefore all applications of the law of the conservation of energy treat of actual, and never of pseudo-problems. There are cases in which the exact measurement of energy magnitudes under discussion offers very considerable difficulties and on which therefore only gross approximations can be reached; but these can not invalidate the general principle. Just so there are very many cases of the law of conservation in which all members of the equation do not permit of measurement; such cases are to be considered as prototheses; that is, that in the case where we can not prove the con-

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clusiveness of the law of conservation by a measurement of all the single members, we make the assumption that the law is conclusive, but we reserve to ourselves the right to submit this assumption to demonstration as soon as possible.

A good example of this kind of scientific progress is shown in the measurement of the physiological evolution of heat in animals and man. The old measurements of Despretz in the first half of the nineteenth century yielded results in opposition to the hypotheses of that day. It was exactly the deeper investigation of this problem which led both Robert Mayer and Helmholtz to the discovery of the law of the conservation of energy. Finally in our days the instruments of measurement have developed so far that the validity of the law has been proven with an exactness of 1:1000 even for physiological combustion (including mechanical and psychical work performed). As long as these latter measurements were not under consideration, the assumption of the validity of the law of conservation for physiological combustion was a protothesis which referred to things that were fundamentally measurable even though the technical accomplishment of measurement was so difficult that one could not place perfect confidence in it. Now it is a scientific truth that is involved, which, to be sure, possesses this quality only to the possibility of error in the ratio of 1:1000. That the law of conservation is also valid in this case is again a protothesis which awaits a demonstration in the future with more delicate instruments of precision.

To the question how the concept of energy in its great universality becomes capable of bringing to expression the infinite multiplicity of facts, the answer is that there are a large number of different kinds of energy, all of whose properties satisfy the above given definition with reference to the character of quantities, the essentially

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positive quality and the law of conservation, but at the same time contain still other additional qualifications or properties upon which their difference rests. Thus for instance, the pronounced binary character of electric and magnetic energy is altogether absent in heat, for this is perfectly determined by a mere number, the unit being given. Kinetic energy has a direction in space while volume-energy acts in every place and in all directions where a change in volume is made possible. Since nothing at all in the general concept of energy is stated about relations of space and time, these are available for narrower definitions and the variations here possible condition the variety of several forms of energy.

In this way is settled the oft repeated objection that the number of the different kinds of energy is extraordinarily large, and we must seriously consider the possibility of other kinds of energy as yet unknown. If energy is a concept that is serviceable for the representation of phenomena, then its variety must be representable by a corresponding variety of the concept. For all scientific subsuming and representation consists in coordinating to the varieties of the domain to be investigated another schematic variety of symbols (of a mathematical or linguistic nature), in which the corresponding functional relation is · brought to expression. What enormous significance such a scientific sign-language has for the mastery of a domain, may be observed perhaps most plainly in the chemical formulas which provide a very considerable part of what universal facts science has been able to ascertain about chemical relations. Just as chemistry can not be blamed for its eighty elements since it is not at liberty to establish a number of its own choice, but is compelled instead to recognize as an element every substance which corresponds to the general definition, so energetics is not free to establish arbitrarily the number of its correlated kinds of energy

but must carefully register the many kinds which present themselves and work out the characteristic indications of each particular species. The unity of this multiplicity becomes demonstrable and fundamental by virtue of the universal law of transformation.

A broader, more essential circumstance in this multiplicity, is the divisibility of all kinds of energy into two factors of characteristically general properties. For each kind of energy a factor of intensity is first determined which does not possess the simple quality of magnitude, i, e., is not directly addible; and in the second place a factor of capacity or quantity which is possessed of an unqualified addibility and which therefore is a magnitude in a narrower sense. The simplest way to conceive of this fundamental distinction is to unite physically two equal values of the kind in question. Two equal intensities will remain unchanged when joined together, but two equal capacities will yield a double result. If, for instance, two bodies of equal temperature or equal electrical potential are combined they remain unchanged and the temperature or potential, as the case may be, will be the same afterwards as before. Two equal masses, entropies, quantities of electricity, etc., on the other hand, when added together yield a double amount. Consequently, the former are intensities and the latter capacities.

Now, the values of these factors of energy bring a new multiplicity into the concept of energy which serves to express more important universal relations not touched upon in the law of conservation. A given quantity of heat for instance is always equivalent to a definite quantity of electrical energy whatever may be its temperature. Whenever one is transformed into the other the same amount is obtained. This indicates that the law of conservation is independent of the difference between magnitudes of intensity; there is an equal independence for magnitudes of

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capacity which appears from the fact that the product of the two produces the numerical value of energy. On the other hand the values of intensity are of decided importance for the question whether a transformation of energy will take place in a given case, and to what extent. These relations have become the best known with regard to heat. We know that a given amount of heat can be transformed into other kinds of energy only in so far as there is a difference in temperature. The unconvertible part is equal to the ratio of the available difference in temperature to the absolute temperature of the transition. But the same statement is valid also for all other kinds of energy. The pencil which I hold in my hand, by virtue of its motion through space which it shares with the earth and all that is upon it, possesses a kinetic energy which many times exceeds that of a discharged cannon ball; consequently it might originate the most incredible disturbances if it could only transfer its kinetic energy to other bodies. But this takes place only when there is a difference of velocity, and hence the enormous velocity which it possesses with reference to the sun's system of coordinates, is altogether unavailable in its terrestrial condition.

Accordingly while the first principle of energetics, or the law of the transformation of energy under the conservation of its numerical value yields an equation for every case where one energy becomes transformed into another, the second principle which governs the relations of intensity of energy, answers the question whether and when a transformation of existing energies would take place. Since two equal intensities do not influence each other (indeed the fact that they do not exert an influence defines the equality of the intensities) every transformation of any energies whatever presupposes some difference of intensity. On the other hand, since everything that happens may be characterized as a transformation of energy of some kind

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or other, the presence of difference in intensity is the general assumption of each occurrence.* When such a difference exists the amount of the occurrence, i. e., the amount of converted energy is proportional to the difference of intensity, and otherwise only dependent on the energies present and their factors. These considerations are collected together as a whole in the second principle of energetics, of which the part relating to heat was discovered by Sadi Carnot as early as 1827. In a more obvious, if not a more exhaustive, form this second principle may be stated with Clausius in the form "energy of rest is not converted of its own accord." Here energy of rest denotes that energy in which differences of intensity are not present and the compelling force by which it is converted lies in the introduction of new differences of intensity into the field under observation. More general is the form that in order for something to happen there must be no compensated differences of intensity, and the occurrence will be in proportion to these differences.

Naturally the question arises as to which rôle the magnitudes of capacity play in our world-conception of energetics. The answer is that in essential points the function of these is the same as that formerly ascribed to matter by the earlier yet undeveloped condition of science. If we consider that mass, weight, and volume, are kinds of energy corresponding to magnitudes of capacity we will again recognize these factors in the old "primary properties of matter." The "secondary" properties prove likewise to be magnitudes of capacity which however do not possess among themselves such close spatial relations as the above mentioned.

The peculiarity that the kinds of energy, volume-en-

^{*}This condition is indeed necessary, but not sufficient, for "compensated" differences of intensity may also exist without anything happening. These relations are also regulated by law, and we have only refrained from entering upon them in order that the presentation might not become needlessly complicated.

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ergy, gravity-energy, and motion, appear always united in space, has led to the concept of matter; but since the amount of these energies is itself variable in any such given formation it became necessary in order to give expression to this variability to assume a substratum for those variable properties which in itself would be without properties and therefore immutable. Thus arose the present logical malformation of the concept of matter as a thing that lies at the basis of all particular objects but itself has no properties by which it can be recognized and demonstrated.

But though it is clear that no satisfactory description of the conditions of ponderable objects can be derived from the concept of matter, the question how it comes that those three kinds of energy are always found combined in the same space, still remains unanswered. The answer may be furnished by the investigation of the question as to what the condition of a formation would be if one of these energies were lacking. If there were no volume-energy then the object would take no room and therefore could not be either perceived or in any way manipulated by us. If there were no motion the object would have no mass and would consequently at the smallest impulse receive an infinite velocity and at once escape all notice. Finally if it had no energy of gravitation, it would not remain upon the earth and so likewise would disappear from our perception. The result is therefore that the combination of these three kinds of energy is necessary in order that the object can become an object of our preception, and that therefore only such formations of the system of energetics can come to our knowledge as contain these three kinds spatially combined with one another. Whether there are formations in which one or another of these kinds of energy is lacking we do not know and can not know, but since they can form no component part of our universe we can not possibly take them into consideration nor have we any reason to.

Thus we admit that a definite experience surely lies at the foundation of the concept of matter; but in the formation of this concept it found only an imperfect and awkward expression, and this is the reason why the continued use of the word "matter" has become unsuited to scientific language. The complex of the three kinds of energy is called "a body" in our present phraseology. It may now be easily understood that nothing would remain of a body if we would deprive it in thought of all its properties, i. e., the energies present within its space; for since the body is nothing but a complex of energies it disappears in thought if the components of the complex should be considered removed.

It can not be my task to demonstrate that physics as a whole (including chemistry and physiology) can be represented comprehensively and exhaustively as energetics. This will even be granted by my opponents; they call into question only the usefulness of such a presentation. But I think that I have demonstrated this clearly enough here and in my numerous text-books. The greater usefulness of the energetic presentation is apparent nowadays in a very characteristic way in physiology and biology. These two sciences have hitherto suffered greatly under the atomistic mechanics, which has filled them with a host of pseudoproblems. I need only recall the countless theories of heredity, all of which possess the typical attribute that they can neither be proved nor refuted, and which therefore have become an inexhaustible source of fruitless discussion. At present we are beginning to see frequently that by referring the problem to the principle of energetics all those pseudo-problems are removed and science at last is placed in the state where it may propose real questions and seek and find real answers to them.

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To be sure energetics in its present form does not yet embrace all the multiplicity of detail the manifestation of which we meet in biological phenomena. The spatial and temporal modalities in the course of a transformation of energy, definite in kind and amount, are especially governed by laws like the Ohm law in which constants of material and form occur in great variety. The theory of these occurrences has been established by Fourier in his theory of the conduction of heat, but a recognized extension of these conditions is still a problem of the future and may be designated as the most important problem of energetics to-day. Biology has everywhere to do with determinations of this kind and in the introduction of corresponding concepts (as, e. g., Reinke's "dominants") there is a demand that such tasks be accomplished even though no way is pointed out for their performance. Such a way would appear only when some general property or common law could be predicated of these "dominants."

On the other hand, the application of energetics in the range of the different sciences is not yet by any means exhausted. As an example of such virgin ground which will bear the richest fruits as soon as it is put under cultivation, I here give at the conclusion of these expositions a sketch of the beginnings of civilization from the standpoint of energetics.

That which distinguishes men from animals we call culture. In its commonest interpretation it consists in the fact that man possesses a much more extensive control over his environment. In other words, he understands how to influence and guide natural events in such a way that they shall take a course which corresponds to his requirements and desires. This ability is not unlimited, but the progress of culture is characterized by the increase of man's dominion over his world. Now if all events are defined as transformations of energy as we have seen, their

control becomes directly dependent upon the control of the relations of energy, and the history of civilization becomes the history of man's advancing control over energy.

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In order to recognize how definitely the facts of this apparently very general observation take form in every single case, we will outline according to the theory of energetics the first evolution of man from his earlier brute condition. We are willing to look upon the use of tools as the first sign of culture in the aspiring human race. But a tool can be accurately defined as a means by which existing native energy is given a character according to some definite purpose. In other words, a tool is a transformer of energy, and the more perfectly it is fashioned to carry out this transformation, the more perfect a tool it is.

Staves, clubs and stones probably served as the first tools. The energy which primitive man (like the animals) first had at his disposal is the chemical energy of nourishment stored up in his muscles. There is a definite amount of this energy which could be actualized in a definite range determined for the position of each body by the length of the arms. Hence when a man took a staff in his hand he increased the radius of his muscular energy by the length of his staff, and was therefore able to apply it more usefully. By the use of a club he could accumulate his muscular energy in the form of kinetic energy and bring it into play with sudden force where the club alighted. By this means it was possible to perform work which could not have been accomplished by the unaided activity of his muscular energy in the form of pressure.

The discovery of throwing was a great step in advance in the line of useful conversion of energy. It united the two stages of progress just mentioned and extended them. The radius of efficiency of muscular energy was thereby greatly increased and at the same time an accumulation of force resulted from a summation of the impetus of the throw. The improvements following upon this consist in the selection or construction of a vehicle for the transmitted energy so as to provide on the one hand the greatest possible amount, and on the other hand the most exact direction. In bow and arrow we recognize a further development of this problem in which the muscular energy is temporarily transformed into the elastic or form-energy of the drawn bow, mainly in order to have the advantage of direction; while its adaptation in a cross-bow is intended to store up the greatest amount of energy that can be stored as long before the shot as is desired, and therefore serves the purpose better.

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Another kind of transformation of energy relates to the concentration of energy in small surfaces, as edges and points; both bring it about that muscular work by virtue of the diminution of resistance in the surface, is able to exercise so much greater an intensity of pressure. A sharp and pointed tool separates and penetrates objects which would remain invulnerable to the fist or a stone.

By a systematic combination of these expedients new ones are brought into existence. Sword and spear unite the increased length of the arm-radius with the concentrated effectiveness of edge and point. With similar adaptation the objects which are thrown or shot result later in the javelin and pointed arrow.

All of these inventions bear upon the valuation of the primary energy which is supplied in human muscles. It was indeed a monstrous advance when other sources of energy were drawn upon for the purpose of the individual. On the one hand we may here consider similar physiological energies; the use of slaves and domestic animals for work indicates this step and indeed I consider it probable that the former was first attained. Next followed the adaptation of *inorganic* energies as well: fire and wind

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were made subservient to human needs. In this way we are led on the basis of the energetic view, by a continuous transition up to the most complicated manifestations of our own day.

A second series of corresponding considerations is associated with the provision of the chemical energy of nour-ishment, which as the first step of muscular energy is a necessary assumption for its generation and utilization. The accumulation of provisions for the times when they will not be directly procurable, results as is well known in the foundation of capital.

Finally value in general rests upon the transformation of energy. One and the same amount of energy measured numerically is of course not indifferent even for the events of nature which do not permit of valuation. On the contrary a given amount of energy is the more convertible the greater the differences of intensity with which it is affected with relation to its environment. The valuation of energy for man's purposes is determined in a similar, although somewhat more complicated way, by differences of intensity and the coefficients of transformation dependent on them. An amount of energy is in general the more valuable, the more completely it may be transformed for man's purposes. Thus a piece of coal and a piece of roasted meat may contain an equal amount of chemical energy (measured as total energy as well as free) while both have a very different value with regard to human purposes. This is because man can not utilize by means of his digestive apparatus the chemical energy of coal, but can that of meat.

This relation characterizes the general state of affairs. Nature offers us native energy: in the first place the energy of the sunbeam, in the second, the products of the transformation of this energy which have been formed without man's assistance. To transfer this native energy into

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such forms as are suited directly to the needs of mankind is the universal task of man in his relation to nature. By every transformation of this kind one part of the native energy is converted by the equalization of intensity (which in the last analysis always amounts to an equalization of temperature) into the unusable form of latent energy, and only a certain fraction of the original native energy serves its purpose. Every machine, every process, in fact every intelligent person who improves this coefficient of transformation is valuable, and the greater the improvement and the more important for mankind the kind of energy upon which the improvement is devoted, the more valuable he is.

This criterion of value is universal. It relates as well to the simplest expedient of daily life as to the loftiest manifestation of science and art. The application of this thought to the different domains of human activity would require a book, so we will let the matter rest with only this allusion, but the reader is urged to apply the principle to any concern in which he is especially interested and to convince himself whether and how it fulfils its purpose.

In all the preceding expositions we have not discussed the relation of *psychical* phenomena to energy. I have long since expressed my opinion that the whole of psychology is undergoing a fundamental advancement through the protothetical assumption of the existence of a psychical energy. This becomes particularly evident in the old problem as to how spirit and matter can operate together, which is recognized as a pseudo-problem and is therefore set aside. If on the one hand there is no fundamental reason to prevent us from comprehending psychical phenomena from the point of view of energetics, and on the other hand so-called matter is recognized as a particular combination of energies, then what was formerly accepted as a contrast in principle between the two realms com-

pletely disappears and the problem of the connection between body and spirit belongs to the same series as the problem of the connection between chemical and electrical energy winch is treated in the theory of voltaic chains and has been solved up to a definite point.

WILHELM OSTWALD.

GROSSBOTHEN, Feb., 1907.

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PROFESSOR OSTWALD'S PHILOSOPHY.

AN APPRECIATION AND A CRITICISM.

CIENCE and philosophy are inseparables, for science rests on certain presuppositions the comprehension of which belongs to the domain of philosophy. sometimes seems as if a deep gulf existed between the two; for according to the law of a division of labor, scientists as a rule plod on in their various lines of research without troubling themselves about the principles that underlie their investigations, arguments, and conclusions, while most philosophers live in their abstractions, moralizing and theorizing in utter unconcern about the facts of physics chemistry, biology, or what not. Some men, however, have risen from the ranks of the scientists who ventured to go deeper to find the bottom rock of science, foremost among whom stands Ernst Mach, who has opened new vistas and pointed out the way to a philosophical pursuance of scientific work, and among his successors none is better and more widely known than his brilliant disciple, Professor Wilhelm Ostwald. Having started as a scientist, he has become more and more a philosopher, and we learn that he has now surrendered his chair of physical chemistry at Leipsic to devote himself exclusively to philosophical work which has grown increasingly dearer to him; but he seems to be disappointed that his colleagues do not follow his lead and are slow in adopting his philosophy. He says (on pages 483-484 of this issue):

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"Except in periods of unusual philosophical activity the specialist in science troubles himself but little with the elements of the universal or philosophical conceptions which he employs for the purpose of classifying his several data; and this is because they apparently do not essentially enter into the consideration of the latter. So specialized science is not only slow to adopt the corresponding thought-formations of contemporary philosophy, but even thinks little of changing them again forthwith to correspond to the modifications of philosophical conceptions. Therefore it remains as far behind philosophy as philosophy commonly remains behind science, whence arises a twofold delay in the philosophical components of the special sciences, which of course does not appear in technical treatises but in the introductions to text-books.... These remarkable conditions must be borne in mind if one would judge correctly the position of energetics in the science and philosophy of to-day."

With Professor Ostwald we believe that philosophy is indispensable to science; but at the same time it is our opinion that scientists ought to move slowly and think twice before they introduce a new and untried philosophy into text-books, or even the introductions to text-books. Their conservatism may indeed be a vice if, as Ostwald suggests, it is due to inertia and indifference, but slowness is better than rashness, and it is preferable to avoid innovations which after a second sober thought would have to be abandoned.

Since Professor Ostwald has grown into prominence, having many friends and admirers both in the old and the new world, we will here investigate his claim to recognition and trust that a discussion of his philosophy will be welcome to our readers.

Professor Ostwald has set forth his philosophical views in his *Vorlesungen über Naturphilosophie*, a voluminous work of extraordinary erudition, and has recently restated them in a terse recapitulation of the leading principles in an essay entitled "Zur modernen Energetik," which has just appeared in the *Rivista di Scienza*, a new philosophical

magazine ably conducted by a committee of directors with the editorial management of Dr. Giuseppe Jona of Milan, and published at Bologne by Nicola Zanichelli. In order to offer to our readers an authoritative presentation of Professor Ostwald's views we publish with the author's kind permission an English translation of this essay which is incorporated in the present number of *The Monist*, and in our discussion we will most frequently refer to this, the most recent statement of his views.

* * *

The salient point of Professor Ostwald's philosophy is the idea that the only reality of the world is energy, hence its name *Energetik*, or as we would say in English, "energetics." Ostwald follows the monistic tendency of the age to reduce all explanations to one supreme principle, and he finds this to be energy, not (as others have claimed) matter. Ostwald says (p. 484):

"The idea of matter as the real substratum of all natural phenomena and as endowed with weight and mass, has arisen from the paramount influence of Newton's theory of gravitation to which at the end of the eighteenth century was added the law of the conservation of weight even in the case of chemical processes. Side by side with ponderable matter earlier science had quietly accepted imponderable matter as well, such as fire, electricity, etc. Even Lavoisier who was the first to point out clearly the remarkable significance of relations of weight in the determination of chemical processes, showed the influence of tradition by including heat and light in his table of chemical elements although he knew that they did not possess measurable weight. However, in the nineteenth century these antiquated notions disappeared completely, and the dualism of matter and force developed, in which upon matter devolved the function of substance in the Aristotelian sense, while the rôle of attribute (Accidenz) was assigned to force. In this way matter became the only real thing in phenomena, and the imponderables, heat, light, and electricity attained thereby a peculiarly false position."

We are further told how Robert Mayer distinguished

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between two things in nature: (1) matter of all kinds endowed with the qualities of ponderability and imponderability, and (2) forces (or as we now would say "forms of energy") which are imponderable. Mayer insists that force is as indestructible as matter although it is changeable and imponderable. According to Ostwald, Mayer follows a monistic tendency, but he is not thoroughgoing in the application of his principle. He stops half way, while modern energetics discards the dualism of matter and energy, and establishes energy as the one and sole reality. Professor Ostwald says (p. 488):

"Now it is characteristic of modern energetics that it sets aside even this dualism [of matter and energy] and installs energy as the sole universal generalization. All phenomena are reduced to properties and relations of energy, and especially matter, in so far as such a concept would at all prove useful, is to be defined in terms of energetics."

The law of the conservation of matter is denounced by Ostwald as an error because matter, says he (p. 486), "does not actually exist at all," for "only weight and mass are conserved while everything else pertaining to matter is changeable." This argument for the non-existence of matter is rather naive. Hitherto we have always thought that matter is weight and mass, and wherever we find weight and mass we have to deal with a reality called "matter." Now we are told that matter is unreal, that its qualities however are real. What would Professor Ostwald say to the retort that energy is a nonentity since there are only tensions and motions. We might in this way even deny the existence of motion, for what really happens is merely a change of place.

Ostwald goes far out of his way to prove that potential energy is real, which to our knowledge has never been doubted; but he further astonishes us by saying (p. 495) that "from the standpoint of a profounder and more gen-

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eral contemplation of the concept of reality the distinction between actual and potential energy becomes an untenable and even dangerous error." Now we grant that potential energy is as real as kinetic energy; it is only latent because it is somehow pent up. It is the energy of tension which, however, can be set free in one way or another. Nevertheless we must distinguish between it, i. e., potential energy, and actual motion commonly called kinetic energy. The former can be changed into the latter and is energy as much and as truly as the latter; but for all that, potential energy is different from kinetic energy, being energy held in abevance. Ostwald represents potential energy as more mysterious than it is, for leaving out complicated cases, what deep mystery is there in the tension of a bow? It is a strain; an incipient motion is prevented from moving. The string is drawn and held back, and when the tension is relaxed by releasing the string, the check is removed and the motion actually takes place. There is no need of any mystification nor of a refutation of a mysterious conception of the facts.

Philosophy would be an easy job if it were nothing but a search for the most general term, but such is Ostwald's idea of it. He says (p. 497):

"What then is the task before us? We must find a concept which is applicable to the greatest possible range of phenomena and offers the greatest possible amount of definite information about each particular case."

It is an inveterate mistake to think that scientific problems are solved by generalization. Generalization is only reliable if guided by due discrimination, and between the two (in spite of Mr. Spencer's eulogies of "the power of generalization") discrimination is the more difficult and the more fruitful. A hasty generalization is exactly what we must be on our guard against. The mistakes of children and of savages occur through wrong generalization by a lack of discrimination. How little Professor Ostwald is aware of the pitfalls of generalization, appears from the fact that he trustingly follows whithersoever generalization leads. He says (p. 488):

"The question why or for what purpose we should or must undertake this reversal of the significance of ideas, is answered by the fact that the concept of energy as a matter of experience is proved to be broader than that of matter. When this is once discerned all discussion will naturally cease. We can not define the concept 'man' by the concept 'negro,' but we can do the reverse."

It is true that we can not define the concept "negro" without the concept "man," but neither can we define it without enumerating those features which are typical of the negro and can not be traced in other species of the genus homo. The qualities common to all men are more obvious and more easily apprehended than those others which form the characteristics of the different species, and the latter are neither included in the former nor can they be deduced therefrom. The more general idea is by no means more useful for explanations than the more specific concepts, for we must not forget that the more general a concept is, the less does it contain, the poorer are its contents, and the emptier it is of detail. Any attempt at deducing all species from their common genus will soon prove a failure.

But the present situation is more complicated, because energy and matter are not homogeneous. Suppose we have the genus "man" and the idea "angel," can we subsume the latter under the former, because angels possess some features that are human? Scarcely! There is an element in the idea of angels which is not found in men.

We grant that gravity which is the most inalienable property of matter is, indeed, a species of energy, but for that reason we do not feel justified in eliminating the term matter. Energy, even according to Professor Ostwald, is imponderable, and yet ponderable matter is assumed to be energy. Energy is not extended, for it is not material nor a bodily reality, yet we are expected to seek in energy the key to the riddles of both space and substance. Professor Ostwald does not betray the secret of his solution, nor can he, for the term "energy" is not the genus of either space or substance. It is the most general term of its kind but it does not possess that universality which he imputes to it.

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Ostwald speaks of "volume-energy" but nothing is gained by the introduction of this compound word. We know what volume is and we know what energy is, but it would be easier to explain the nature of a fish from a mermaid than the character of volume, of space, or of extension, from volume-energy.

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Efforts have been made before Professor Ostwald to find a common term for both matter and energy, but all attempts have failed and must fail, although we grant that matter according to its mass possesses a definite amount of energy called gravity which changes with a change of position. We had a discussion on the subject more than thirteen years ago with Mr. Paul R. Shipman whose theory on the identity of matter and energy is, if possible, even more ingenious than Professor Ostwald's, but it is no less faulty in its logic. Mr. Shipman's mistake is ultimately the same as Ostwald's, a misapplication of the monistic principle combined with a wrong method of generalization.

It will help us to understand the mistake of Ostwald, if we become acquainted with his American counterpart and hence it will not be too great a digression if we quote some striking passages from Mr. Shipman's article "Suggestions Touching Matter and Energy," which appeared in No. 349 of *The Open Court* (May, 1894, pp. 4063 ff.) There he says:

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"Speaking roundly, as well as figuratively, we may call matter funded energy-energy current matter; or matter we may distinguish, roundly, as visible energy—energy as invisible matter. Take, for example, the clod at your feet. It is matter, you say; yet analyse it, pushing the analysis as far as you may, and you get nothing but modes of energy, with a residuum that offers nothing différent. Nevertheless, these parts together make the clod. Whither does this unquestioned fact point, if not to the conclusion that matter and energy are in essence the same? Nothing but energy can be got out of matter, because matter is nothing but energy more or less compounded, as energy is nothing but matter more or less resolved. Matter, one may say, bears the relation to energy, always speaking roundly, that a stocking bears to the thread of which it is knit: ravel matter, and you have energy-knit up the raveling, and you have matter again. Energy is the simpler state of the common substance-the raw material, as it were, of which matter is the elaboration in greater or less degree.....

"The insensible is conceivable only in terms of the sensible, into which, if real, it is transformable. Cognition of the insensible supposes cognition of the sensible, conception being possible only within the limits of possible perception. Let this truth be firmly grasped. The intellectual currency that is not redeemable in the standard coin of the realm of sense is worthless. What cannot be translated into resistance has no existence, no reality, no meaning, is nothing. Whatever resists exists, and, conversely, whatever exists resists. Resistance and existence are interchangeable terms; but resistance is synonymous with energy or force, which is the stuff of sensible matter—that of which sensible matter is the more or less complex form. For existence, be it observed, though fundamentally one, is divisible superficially into ponderable matter, or matter so named, and imponderable matter, or energy, whereof each is tranmutable into the other, the two mutually blending to form the sum-total of reality."

Mr. Shipman's article is noteworthy on account of the ingenious way in which he renders his identification of matter and energy plausible to the reader, but there is no need of subsuming everything under one head. Among other things we said in our reply:

"When we make the abstraction 'matter,' we select certain fea-

tures of our experiences, and drop all others. When speaking of the matter of which a man is composed, we advisedly omit his feelings, his intelligence, his character, his plans, and purposes, and so forth. When speaking of motion, we mean change of place, and not mass, not matter, not spirit, nor anything else; when speaking of force, we refer to that which can produce motion and overcome resistance.

"This seems clear enough, and yet how much is this elementary rule of thinking sinned against! There are plenty of pseudo-monistic philosophers who are perfectly satisfied as soon as they have stored all their ideas into one box of their favorite generalization. Whenever they try to think their ideas to an end they become entangled in contradictions, and seeing no way out of it, they naturally turn agnostics.....

"To-day Mr. Shipman presents us with a number of conundrums which grow out of the henistic principle of his method. We are told that 'matter and energy are in essence the same.' 'Force is material,' yet at the same time 'matter is immaterial.' This being so, the old refrain follows: 'Existence is an inscrutable fact.'

"That any one could regard 'change of place' as a material thing seems impossible, but such is the consistent sequence of Mr. Shipman's materialistic henism.

"There are a number of minor points in Mr. Shipman's article; e. g., 'energy is something moving,' while it is the actual or potential moving of something; matter and energy are 'transmutable each into the other,' which is a new law that if true would produce changes more wonderful than Aladdin's lamp; 'energy is a form of matter, and is its own vehicle'; which sounds like, 'a blow is the fist which deals the blow, and a blow is its own striker'; 'no atom moves without loss of substance,' an observation which, for all we know, might prove true, but where is the verification of this startling proposition? Shall we believe that the ether profits thereby and is thus constantly increasing, or is this loss of substance an absolute loss so that in the long run the world would dwindle away? 'What cannot be translated into resistance has no existence.' Can we translate the theorem of Pythagoras into resistance, or the ideas of truth, beauty, and righteousness? And as we cannot, have they, therefore, no existence?"

We have to grant that matter contains besides its gravity (i. e., the weight which matter exerts and which can

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be expressed in terms of energy) the additional feature of volume which can not be described in terms of energy; and further, while all other forms of energy are transferable from one body to another, gravity is always inalienably joined to a definite mass. These considerations are sufficient to continue the discrimination made between matter and energy. Even if Mr. Shipman's contention be granted that we know matter only in terms of the energy which it exerts, we must confess that there is a residuum, and this residuum of matter is the substance of or from which matter is formed.

The difficulty of the concept matter lies in the fact that it is not yet an ultimate generalization like energy and form, for it is not a simple but a complex idea. Matter is commonly defined as volume and mass, and so it is extended in some shape or other (i.e., it has form), and is possessed of energy. It is quite justifiable to look upon the energy exercised by the weight of a gravitating body as essentially the same as other energies; for the falling stone, the gushing water of cataracts, the pressure of a weight in a clock, etc., can do work as well as the heat of burning coal and electricity. On this point we agree with There is only this peculiarity that gravity is inseparable from mass. Its energy is localized and it can not be absolutely detached from the body to which it belongs except in portions by a change of position. When raising a stone we add to it a certain amount of energy which is given out again when it falls. The mass itself, however, remains the same and we have not yet succeeded in resolving any portion of mass into pure energy. Mass constitutes a kind of substratum which remains, and on its account, naturalists are justified in retaining the word "matter."

We deem it quite probable that matter has originated from ether, and that ether is the simplest form of existence.

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We assume that ether is the stuff the material world is made of and that it has been changed into matter by condensation. In other words: energy somehow seizes upon ether and creates within it a rotation causing in the ocean of its originally homogeneous mass, innumerable little whirls, which with their swift currents produce among themselves the tension of gravity. Thus gravity may be the work of energy, and matter its product; but in that case we would mean by matter a certain energized form of the ether, and we would still retain the notion of a substratum, a quantity of something, a substance, a material.

Thus a final analysis of all material things would lead us to the assumption of a world-substance (which, from our present knowledge, appears to be the ether) as an ultimate substratum of all existence, itself imponderable and not possessing the properties commonly attributed to matter; but when condensed into whirls the ether acquires a tension decreasing with the distance in all directions, and creating a mutual attraction between any two sets of such whirls, which from a priori mathematical considerations should be directly proportionate to the product of both amounts of energy needed for their contraction and inversely to the squares of the distance between their centers,—and this would be the Newtonian formula for gravitation.

The problem of the origin and final dissolution of gross matter is not yet sufficiently matured for discussion, but the theory has lately been rendered more probable by the experiments of Ramsay, which promise to amplify our knowledge of matter, but even if the idea of the eternality of matter will have to be surrendered, we see as yet no chance for disposing of the word "matter," still less for disproving the existence of its reality. Evidence of the instability of matter will only modify the law of the conservation of matter into the wider generalization of the

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conservation of substance. It is the idea of substance which we can not get rid of, and to be fair to the formulators of the law of the conservation of matter we must grant that they meant the conservation of substance. They simply meant to deny a creation from nothing; and we would say that all creation consists in a formation, or in other words, all processes are transformations.

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In reducing all things, even the soul, to energy, Ost-wald follows the principle of his great teacher Ernst Mach, who in one of his masterly expositions on the nature of cognition points out that the method of comprehending the unknown consists in defining it in terms of the known with which we are familiar. This is quite true if the known and the unfamiliar (i. e., the not understood) are homogeneous, but not if they are heterogeneous.

We accept Mach's principle as the quintessence of monism which consists in a unification of facts. But here is the salient point of difference between our conception of monism and the current interpretation of it, as we have pointed out on several occasions. We define monism as a unitary conception of the world. The cosmos is a great whole dominated by one principle that is consistent with itself. There are different aspects of it, as there are different conditions, and these different aspects are formulated by scientists as natural laws so called, but all natural laws are only one and the same law in different applications. The world is full of contrasts, but the constitution of the world, the entire system of its laws possesses no contradictions. Wherever we meet with a contradiction, it is apparent only and we are confronted with a problem. The problem is solved as soon as the contradiction has been overcome and a monistic interpretation found.

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mind which, like the mariners' compass, has guided us in our search for truth, and it has heretofore proved true. We have good reason to believe that its reliability is well founded in the nature of things, which means that it not only possesses a subjective significance, but that it is ultimately rooted in the constitution of objective reality.

In contrast to our monism as a unitary conception of the world, there are other monisms which seek the unity of the world, not in the unity of truth, but in the oneness of a logical subsumption of ideas. Monists of this type produce systems whose unity is artificial, purely external and sometimes palpably erroneous, wherefore we designate their views as pseudo-monism.

Professor Ostwald, for instance, is satisfied to build his philosophy upon the concept of energy as its cornerstone, merely because he thinks it is the widest generalization possible; and there are other monists who select other generalizations, such as matter or spirit, as their foundation. This is not establishing a unitary view which preserves the contrasts that actually exist, and only removes the contradictions. This is twisting the facts into the philosophy of a single idea; it is henism,* not true monism. In other words, henism is the establishment of an external and indeed a wrong unity which does not do justice to the contrasts that actually exist, while true monism is a unitary conception which does not deny but explains the contrasts and shows them to be factors in one consistent system of truths.

It is characteristic of henistic thinkers to denounce all general concepts as mere abstractions with the exception of

^{*} Henism is derived from the Greek els, èvos.

We have repeatedly had occasion to call attention to henistic theories which go by the name of monism. See, e. g., our discussion of Professor Haeckel's monism in The Monist, Vol. II, p. 498, and especially in The Open Court, Vol. VII, p. 3528. Compare also The Monist, IV, No. 2, p. 228 and a brief review of "Haeckel's Theses for a Monistic Alliance" in The Monist, Vol, XVI, p. 120 f. It is natural that pseudo-monists look upon a true monism as dualistic, since it recognizes the existence of contrasts.

their fundamental notion, be it spirit, or matter, or energy, or God, or anything else. So to Hegel the most real thing is the absolute, to Schopenhauer it is the will, and to Ostwald, energy. We notice his complaint that the word energy may mean at the same time both the abstract notion and the concrete reality. Like all henists he overlooks the fact that the same is true of all abstractions. All generalizations are abstractions, and we insist that all abstractions denote realities,—if not real things, yet certainly real qualities, or something that is actually present in one way or another in different things. Abstractions are empty or unreal only to those who are incapable of thinking in abstract terms. To the trained thinker all general ideas have been deduced from experience and possess therefore a real value, they denote actualities.

It is characteristic of all pseudo-monistic theories (perhaps of most philosophies that go astray) to overlook the significance of form, which is the most important of all abstractions. We have insisted on this truth so much that we might characterize our own philosophy as the philosophy of form. Instead of trying to unify matter and energy, we insist that the oneness of the world is based upon the systematic unity of form-popularly speaking of the universality, the intrinsic necessity, and harmony of the laws of form. We are confronted with uniformities which are formulated as natural laws, and all uniformities constitute one great consistent system. Moreover, the whole of reality forms one inseparable unity of which all things are parts. No single thing can be taken out and be set aside as a thing in itself. There are no things in themselves. Everything is what it is only as a part of the whole, and this is true of all our abstractions. We classify our abstractions into hierarchies of genera and species, which procedure is possible in the world of objective existences only because there are uniformities, and we find that laws

of form dominate all changes and govern the formation of all beings.

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Here appears the importance of the abstraction of form together with all the sciences of pure form, logic, mathematics, the algebra of thought, arithmetic, etc., which is the field of Kant's *a priori*, an idea which is now commonly but erroneously discredited, for all science, in fact every rational argument, is based upon purely formal thought which in its very nature is *a priori*.*

Our analysis of the objective world yields three abstractions which, each in its own way, are the widest generalizations; they are substance, energy and form, but form is the most important among them.

Man has become a rational being by his formal thought. The speaking animal develops reason, and human reason in contrast to the thinking faculty of brute creatures is distinguished by the ability of abstraction, i. e., by denoting in word-symbols the uniformities of nature. Formal thought (logic, arithmetic, mathematics) is always the backbone of abstract reasoning. A cat may miss one of the number of her kittens, but she can not count them. To think in abstract terms, to classify things as genera and species, to count and in general to formulate the uniformities of experience, to utilize this knowledge for the purpose of mastering his surroundings, is the privilege of man.

It is noteworthy on the one hand that all formal concepts such as number, geometrical figures, logical relations, etc., can be constructed without reference to actual things, by purely mental processes; and as such they exhibit methodical systems in which all relations are intrinsically necessary, or, as it has also been expressed, we arrive at conclusions which are uniquely determined. On the other hand we find that these purely mental constructions furnish

^{*}Cf. on the subject the author's Fundamental Problems, Primer of Philosophy, and Kant's Prolegomena.

the frame work of our comprehension of nature, for the main laws of nature are identical with the highest generalizations of reason. This is Kant's problem, so splendidly treated in his Prolegomena.

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We emphasize the significance of form and with it of formal thought, because the lack of its recognition must have been the cause of Professor Ostwald's anxiety to seek the solution of all problems in energy. All problems are problems of form. The terms "matter" (or better "substance") and "energy" are simply two denotations of existence, the former of reality (or thingishness) the latter of actuality, (i. e., the effectiveness of all actions or transformations); and the two ideas of actuality and reality are so closely interrelated as to render the words almost interchangeable. According to Ostwald it is sufficient that existence is actual, it need not be considered as real, but neither the actual nor the real can exist without the other. by discarding either of the two we are very little helped because both terms denote the ultimate facts of the manifestation of existence. The terms matter and energy explain nothing and can explain nothing, for explanations are always the comprehension of a transformation. terms matter and energy only denote that the objects under consideration are real and that the events are actual.

If energetics provided the correct solution, we would after all have to trace the different forms of energy, and if materialism were right, we would have to trace the forms of matter, and so matter as well as energy would in either case remain unanalysable ultimates, one denoting the reality of existence, the other the actuality of all changes. Wherever we turn we find that these notions of actuality (i. e., energy) and of reality (i. e., substantiality) explain nothing; they merely denote that we deal with objective

facts. Explanations are always due to a tracing of the formal aspect of phenomena.

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Ostwald expects that from the standpoint of energetics all the sciences have to be recast, not only physics and chemistry but also history and economics, yea psychology too. The progress of civilization, e.g., should be regarded merely as "a transformation of energy." The quantity of energy, Ostwald claims, is not indifferent even in that sphere of nature which is void of valuation, but it counts also for man, only the situation is complicated, and "an amount of energy is, in general, the more valuable, the more completely it may be transformed for man's purposes" (p.513). He says that the reason why certain things with less energy, e. g., food-stuffs, are worth more than, e. g., coal is due to the mutability of the former, but it will be difficult to explain from Ostwald's theory how a diamond which contains little energy and is possessed of no great mutability can fetch so high a price.

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What Professor Ostwald says of pseudo-problems is not to the point, and we can pass it over in silence, while his distinction between hypotheses and prototheses is not helpful. According to him the soul is a peculiar kind of energy, and this assertion would have to be regarded as a protothesis, (i. e., a preliminary thesis) not a mere hypothesis (i. e., an assertion that can neither be proved nor disproved because it deals with fictitious assumptions.) And the test for its being a protothesis consists in this that we can substitute for the term soul a value of energy, —as if an idea became true by being defined in terms of a measurable quantity of energy!

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The duty of the scientist, and also of the philosopher among scientists, is not to subsume all generalizations he

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under one common head, but to construct a thought-picture of the world or of any special phenomenon which happens to be under consideration in well-defined terms for the purpose of describing it with accuracy in all its essential features. Mach calls it "ein Nachbilden der Thatsachen." This thought-picture should appropriately represent its analogous reality in such a way as to show thereby how things originate and how events take place through definitely determined transformations. We are very little helped by materialism when we are told that everything is matter, that bodies are matter, and that thoughts are merely a function of matter, and Professor Ostwald's energetics is not a whit better when it tells us that matter is energy, and that the soul too is only a factor of energy. This is no explanation of the nature of the soul; on the contrary it obscures the problem and introduces a misunderstanding of the work previously done by our predecessors.

Professor Ostwald rejects the theory of parallelism in psychology, and he refers to Leibnitz who insisted upon the difference between mechanical processes and consciousness, claiming that consciousness is not motion, and motion can never be turned into consciousness. We doubt whether Professor Ostwald ever gave a close attention to the problem which Leibnitz had under consideration, for if he had done so, he would never have propounded his solution that the soul is energy. He concedes to Leibnitz that psychic states shall not be regarded as matter in motion, but he sees no absurdity in their being a kind of energy.

He says in his Vorlesungen über Naturphilosophie, p. 396:

"I know no more convincing proof of the philosophical value of the world-conception of energetics than the fact that in its light this old problem loses all of its terrors. The difficulty arises simply from the assumption of Leibnitz, as well as Dubois-Reymond and

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Descartes, that the physical world consists of nothing but matter in motion; of course in such a world, thought can have no place. In looking upon energy as the final reality we perceive no such impossibilities. We have seen in the first place that manifestations of nerve-control may be referred to processes of energy without contradiction, and we have seen that nerve-processes which are accompanied by consciousness are constantly combined with unconscious processes. I have taken the greatest pains to find any absurdity or unthinkableness in the supposition that consciousness is determined by definite kinds of energy. I have not been able to discover anything of the sort. As soon as we investigate the most important phenomena of consciousness we become at once convinced that they are dependent on energy, and to my mind it is no more difficult to think that motion is dependent on kinetic energy than that consciousness is dependent on the central nervous system."

Leibnitz's criticism of the mechanistic theory with which Professor Ostwald has become acquainted through Dubois-Reymond, hits Ostwald's energetics just as severely as any materialistic philosophy, and when Ostwald declares that he does not feel it, it only proves that he does not understand Leibnitz's argument.

If we bear in mind that the abstractions we make should denote exactly the value of the features which they describe, nothing more, nothing less, we must grant that motion means motion, not thought, not consciousness, not sensations. Accordingly we can not deduce from the abstract idea of motion anything that remotely resembles psychic activities. The soul with all that is implied thereby belongs to another set of generalizations. All the mechanical events in the world constitute a complete mechanical system, being all kinds of forms of motions and tensions which are transformed into one another. Nowhere can there be a gap, and all changes of place must be due to a push or a pull, never to a feeling, nor a thought, nor a state of consciousness, and *vice versa*, neither motions nor tensions can produce consciousness.

We will quote the passage in question. Leibnitz says:

"If we could imagine a machine the operation of which would manufacture thoughts, feelings, and perceptions, and could think of it as enlarged in all its proportions, so that we could go into it as into a mill, even then we would find in it nothing but particles jostling each other, and never anything by which perception could be explained."

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The brain is such a machine. It manufactures thoughts, feelings, and perceptions. Now then, if we assume that the brain could be so enlarged in all its proportions that we could enter into it as into a mill and watch its operations we would see motions and tensions, states of kinetic and potential energy, pressures and counter-pressures, and their apparently insignificant motions setting free the pressures and changing states of apparent inactivity into work, but we would see no feelings, no sensations, no consciousness. And why not? Simply because feelings, sensations, and consciousness can not be seen; they can never be objects of sensation; they can not be touched by the hand or observed by any one of our senses. And why can they not be objects of sensations? Simply because they are not objects; they are subjective states.

Feelings can only be felt and it is obvious that we can feel our own feelings only, not the feelings of others. But while we could never see the feelings, nor sense them in any way, even if we could enter the workshop of the brain and watch the mechanism of consciousness in all its wonderful details, we could see some movements of this thought-machine which we would have reason to assume to be accompanied by feelings. The mechanism of the brain is complete. It is pull and push that produces motion, and there is no gap in the chain of mechanical events. Such is the nature of the objective world, of the Not-me, of things observable. We find there only transformations, only changes of matter in motion. If we knew nothing about existence but the data of our experience, if we did

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not know ourselves, or if by some trick we could be prevented from becoming aware of our own existence as conscious beings, we would not know that there are such things as perception, sensation, feeling, sentiment, thought. We know of their existence only through self-observation, through the immediate fact of our own feelings. We have no direct knowledge of the feelings of others; we only assume that other bodies organized in the same way as we and behaving like ourselves under analogous circumstances have analogous feelings.

These considerations are the basis of the theory of parallelism which since the days of Leibnitz has been accepted by such psychologists as Herbart, Weber, Fechner, Wundt, Hering and others, and which is not a dualism. but true monism. For it must be understood that the recognition of a duality and pointing out of contrasts does not mean that there are two heterogeneous things, and that reality is a composition of two incompatibles. simply means that existence is not a rigid unit, but a process, a state of action and reaction, which is necessarily polarized into contrasts. The inner condition and the outer manifestation are one reality. There are not subjective states which are nothing but psychic, and there are not objective realities which are nothing but forms of matter in motion. The term "parallel" refers to our abstractions, not to the realities themselves. In reality subject and object are one; subject is an existence as it appears to itself if viewed from within itself, and object, as viewed from the outside. I feel myself to be a sentient being, but to others I appear as a body of definite shape, moving about in space.

Though materialism and energetics are exactly in the same predicament, Professor Ostwald regards the former as untenable, the latter as well founded. The truth is that he keeps one measure for materialism and another for his

pet theory, energetics. He says in his Vorlesungen über Naturphilosophie, p. 397:

"If we know from experience that man's spirit is associated with the 'matter' of his brain, there is no reason why spirit should not be connected with all other matter. For the elements carbon, hydrogen, oxygen, nitrogen and phosphorus in the brain are no different from the same elements as they occur everywhere else on the earth; because of the transformation of matter they are constantly replaced by others whose origin is quite different as far as their action within the brain is concerned. Therefore if spirit is a property or effect of matter in the brain, then according to the law of the conservation of matter, it must, under all circumstances, be a property of the atoms assumed by the mechanistic theory, and stones, tables, and cigars must have souls as well as trees, animals and men. In fact, granting the assumption, this thought obtrudes itself so irresistibly that in later philosophical literature it is either recommended as correct (or at least as reasonable), or else a decided and insurmountable dualism between spirit and matter is erected in order to evade it."

This argument is as unfair as it is superficial, and it applies with equal force to energetics. There are as many different kinds of matter as there are different forms of energy. While the elements remain oxygen, hydrogen, carbon, etc., their combinations exhibit new qualities which do not exist in their separate states and originate through the new formations into which they are joined. In the same way motion is change of place, but the motion may be molecular such as heat, or molar such as the movement of mass, or pressure such as potential energy, etc. Ostwald's argument that if the action of brain matter is associated with consciousness we ought to attribute the same quality to the burning cigar, proves a boomerang in his hand, for what is true of matter in motion is true also of energy. It is astonishing that Professor Ostwald does not feel how hard he hits himself. He continues (ibid., p. 397):

"Even this difficulty takes flight before energetics. While

matter follows the law of the conservation of the elements so that the amount of oxygen, nitrogen, etc., present in a limited space in a combined or uncombined condition can not be changed by any known process, yet in general it is possible for a given amount of energy to be converted into another without leaving a measurable residue of the first. Experience therefore in no way contradicts the idea that particular kinds of energy require particular conditions in order to originate, and that whatever amounts of energy are present can also disappear again altogether by means of conversion into other forms. This is the case with spiritual energy, that is, with unconscious and conscious nerve-energy."

No fond mother can be more blind to the faults of her own child while chiding the children of other people than is Ostwald with the child of his own nerve energy. We must abstain here from pointing out on the one hand how little we are helped by Professor Ostwald's declaration that everything is energy, and on the other hand how unsatisfactory his several solutions are, e. g., his theory of pleasure and pain, his conception of art, his definitions of good and bad,* etc., we will limit our further comments to a brief explanation of the problem which Professor Ostwald has failed to understand.

Our conception of energy denotes energy, nothing more, nothing less. We mean by it that particular feature of our experience which all forms of energy possess in common. Under the general concept of energy we subsume all the various kinds of energy, potential as well as kinetic, and we observe that one form of energy frequently changes into other forms and that without increasing knowledge we can guide these changes at will. Heat, light, electricity have been discovered to be forms of energy, i. e., they have been proved to be forms of motion and it is by no means impossible that there are forms of energy still unknown to us. But one thing is sure that however wonderful the different known and unknown forms of energy are or may

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^{*}These subjects are discussed by Professor Ostwald in his Vorlesungen, and we refer the reader especially to pp. 388 ff., 433 ff .and 450.

be, energy will always remain energy (a motion or a tension) and will never be something which is not energy. Feeling may be conditioned by a state of nervous commotion in the brain, but feeling is not energy; neither its nature nor its origin can be explained from the idea of energy. But while feeling is not energy, it may be associated with it as an accompaniment that appears under definite conditions.

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We must remember that energy is an abstraction. It does not denote the whole of the world but only one definite feature of our experience. When the general terms in which we describe the objective world do not contain concepts under which the characteristic feature of consciousness can be subsumed, we must conclude that the objective world is not the whole of existence, but that there is a subjective side to it which for a description needs terms of its own.

We are compelled by the logic of our argument to assume that all objects, even those that are lifeless, are possessed of a subjective interior, but we will readily grant that the appearance of feeling depends upon organization. Stones may possess potential feeling, but we would refuse to say that they perceive the impression made upon them. There is no need of assuming that the burning cigar suffers pain. Things that have no organs of perception can not be regarded as sentient. In plants we can notice mere irritability but not sentiency in the sense that we possess it. Actual sentiency develops in an organ that stores up feelings in the form of memories, being thus enabled to note the impressions made upon it, to compare them to, to contrast them with, or subsume them under the memories of prior analogous impressions and so become aware of its feelings. If there are feelings in the unorganized portion of objective nature we can understand that they must be absolutely latent, because they are isolated. Feelings must

be felt in order to be actual feelings, and so even on the supposition that all objective existence is potentially subjective, we must grant that in inorganic nature there can not be any consciousness.

It can not be our plan here to offer a full exposition of all the problems which, in our conception, Professor Ostwald has failed to solve. We merely deem it our duty to point out his errors, and the way to their correct solution.

We have on other occasions (especially in The Soul of Man and in Whence and Whither) set forth our own view of the nature of the soul, the rise and significance of consciousness, the origin of mind, and kindred problems treated from the standpoint of the philosophy of science. It is very desirable that men of science turn to philosophy, and we recognize the good intentions of Professor Ostwald. Considering his high standing and his general proficiency which we fully appreciate, we regret to find him not sufficiently equipped for the philosophical task he has set himself. In spite of his merits in his own line of physical chemistry, his wide range of knowledge, his conspicuous success as an academic lecturer, and his many meritorious works on science, we must say that his methods are mistaken, his main conclusions untenable and his philosophy deficient.

If our exposition of the problems under discussion can be proved wrong we are ready for correction, but if it be of any assistance to Professor Ostwald and to other scientists who like him try to build up a philosophy of science, we would deem our labors gloriously rewarded and the main purpose of our philosophical work crowned with success.

EDITOR.

THE EVOLUTION OF CHRISTIANITY.1

[Professor Pfleiderer, one of the most prominent leaders of modern theology, a man who with all reverence for traditions is determined to admit the light that a scientific and critical research throws on the problems of religion, has lately published a series of books on the difficult subject of the origin of Christianity. His three latest works are Die Entstehung des Christentums, Religion und Religionen, and Die Entwicklung des Christentums. The last mentioned is just out and we owe it to the courtesy of the author that almost simultaneously with its appearance, we are able to present to our readers its leading ideas as expressed by the author in an introductory condensation. The three works in question have been published by J. F. Lehmann of Munich. Ep.1

In spite of all that with a show of reason can be said to the contrary, I for my part am of the firm conviction that even theology will have to admit sooner or later an unreserved recognition of the principle of evolution to be rigorously applied in all the domains of Biblical and ecclesiastical history. In so doing—and I know that I still oppose an overwhelming majority,—theology will derive a great benefit, especially in the fact that it will then finally become of equal rank with the other sciences which took this step a century earlier; but also in the fact that the result will be a mitigation of the intrinsic antagonism between the different ecclesiastical tendencies, which have attained their present excessive intensity entirely through this antagonism, so that everywhere it is only dogmatism that contends against dogmatism,—the one, indeed, being always as narrow and exclusive as the other.

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All this will be changed with the attainment of the evo-

¹ Translated from the German by Lydia Gillingham Robinson.

lutionary mode of thought, for that is like the magic spear of the legend which both inflicts wounds and heals them. It liberates thinking spirits from the heteronymous fetters of the past while it converts all the alleged absolute authority of the past into the conditional products and relative factors of evolution of its own time. On the other hand it also recognizes in the forms of belief and life which originated in the past and are foreign to us to-day, the natural manifestations of truth which are justified for certain steps in evolution,—the comparatively true intermediate steps through which the human spirit uplifts itself out of the fetters of nature into God's freedom,-and therefore it fosters regard and reverence for these ancient forms of faith. Because of this reverence, the evolutionary point of view, and only that, serves the exceedingly valuable purpose of all historical science, which consists in the ability to comprehend the roots of our present life and endeavor that were planted in the past, and to preserve their nourishing powers without permitting them to become fetters for our self-development in the present or for our ceaseless striving after the ideals of the future. "To conciliate reverence with lucidity, to deny the false and yet to believe and to reverence the truth," Carlyle, the historian and philosopher, has rightly pointed out as the task for which historical education will fit the people to-day. My latest works2 have been devoted to this reconciliation, and in a still more recent one³ I propose to sketch the development of Christianity up to the present day, not, to be sure, in the sense in which I might give a summary of ecclesiastical and dogmatic history, a sketch of all the material which has been collected into text-books, but I will bring out only those main points of the history of Christianity which are suited to show in what way, through what intermediate

² Die Entstehung des Christentums and Religion und Religionen.

³ Die Entwicklung des Christentums.

steps and from what natural motives the Christianity of the New Testament has become the Christianity of to-day. This way is long, and the intermediate steps are many; but it is necessary that they be understood in order to appreciate the Christianity of the Bible in its distinction from that of the present, as well as the right of Christianity to-day,—the right which lies in the fact that it is the lawful fruit of the legitimate development of the Christianity of the Bible. Christianity would not be what it is, if it had not had its evolution through the nineteen centuries of which ecclesiastical history treats. But can we really think of an evolution here? Right in the title of this paper a problem is involved which we may not set lightly aside if we consider that not until the work of Baur of Tübingen within the last fifty years has the treatment of ecclesiastical history been seriously considered from the viewpoint of evolution either by the old Catholic or Protestant Churches or even by rationalists.

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It has not been given serious thought by Catholics because Catholicism regards Christianity as a divinely given quantity and institution founded by Christ through the Apostles. The dogma of the Church is looked upon as a revealed unchangeable truth from the beginning, to which time only adds greater luster. The organization of the Church also, the episcopal office, the whole hierarchy with its head in the pope, is considered as founded by the Apostles and elaborated with their divine authority; but all changes in ecclesiastical history, they say, are only the manifold ways in which the truth and grace which are given in the Church have been attacked by the hostile world and the Devil, and always triumphantly vindicated. According to this view there is only an outward effect; internally nothing is changed. The Church remains ever what it is, a completed structure established in the world by God. No evolution is here, no internal development,

no separation into opposed factions, only vindication and constantly outspreading propagation of the continuously identical organization.

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This naively optimistic conception was opposed by the old Protestantism with an equally naive pessimism resting upon the same assumptions. Here it was the writers of the Magdeburg Centuries who proceeded from the same assumption as the Catholic historians, i. e., that Christianity was given by God complete in the New Testament by a miraculous revelation as a perfect means of salvation and redemption. There is however the following difference: While Catholicism sees in the progress of history the ever completer conquest of the divine organization of the Church over the world, the old Protestantism reverses the matter and says: "Yes, the New Testament Christianity is the divine truth, but what have you made of it? You have perverted it to the opposite extreme! Not only has the Devil attacked the truth from without, but he has penetrated into the Church itself. He has displaced even its main article of justification by faith, and in the organization of the Church he has his hand entirely in the game. He has finally found his incarnation in the Pope as the 'Antichrist.' "

This is the pessimistic answer of the old Protestantism to the optimistic deification of the Church by Catholicism. Certainly the old Protestantism found itself in a contradictory position in so far as it accepted unconditionally the dogmas of the first five centuries, and believed in them as divine truths of the same Church which it considered so permeated and polluted by the Devil. And yet these dogmas arose at the same time in which the ecclesiastical customs, ritual, and organization developed. How remarkable that the Archenemy carried on his game in customs and organization, and in certain articles of faith, while in others he took no part,—and these the most important

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doctrines of the Trinity, Incarnation, Original Sin, Atonement, etc., which are all looked upon as truth! This is an untenable inconsistency only to be explained by the historical status of the old Protestant critique of Church history.

Now rationalism was too enlightened to adopt this transcendental view of history which operated by means of the Devil. In place of the Enemy from the other world, rationalism set up the enemies of this world, the cunning priests who had themselves constructed their organization by lying and deceit, so that the whole had become a human structure. From this point of view the entire history of the Church appears as a play between error and violence. a game of human opinion, error, and blundering. This is the rationalist conception. Here too, evolution does not enter. The fundamental thought in the doctrine of evolution is that things develop from their beginnings by the intrinsic necessity of their nature, while with rationalism all is mere chance and caprice;—only, unfortunately, this or that pope had such ambitious thoughts, such false views and opinions. Of divine truth and divine control little enough can be found in Church history. This is called "pragmatic historiography" because an effort is made to bring to light the accidental motives of single individuals and so to find the spirit of the times. The "spirit of the times," however, was usually the spirit of the masters and the alleged motives of the various actors were invented by the historian himself. This view was no more objective than the pessimistic view of Protestantism or the optimistic glorification of the Church in Catholicism.

You see that within Catholicism, the old Protestantism, and this rationalism, there was no question of an evolution of Christianity. The thought of evolution which has entered into the science of history since the time of Herder and Hegel, and which to-day rules supreme in profane

history, has been brought also into the consideration of Church history by Baur. According to him Christianity is the religion of the divinity of man, the elevation of mankind to the consciousness of its spiritual unity with God and freedom in God. This is the new and peculiar feature of Christianity by virtue of which it stands above all other religions. This new religious principle was present in embryo in Jesus in his devout character, in his living faith in God, and his pure love for man, but it was still enveloped in the Jewish form of the Messianic concept and limited to the Jewish nation, which limitation of course is in contradiction to the idea of the religion of the divinity of man which must include all mankind. The universal religion of the spirit, therefore, in order to rise to the fullest consciousness of its individuality must first be freed from the narrow shell of the Jewish national and legal religion. This was the work of the Apostle Paul who, however, opposed for this reason the original Jewish-Christian faith of the primitive congregation. So evolution from the beginning has advanced through opposition which in no case contained the whole pure truth. This antagonism had to be overcome by a higher unity, the Johannean interpretation. So also in the farther course of history a certain solution had each time become the germ of new problems which demanded new struggles; only thus, through constant separation in various directions, each of which possessed for its time a comparative truth and justification,-only by means of this evolution which advanced step by step by opposition, has Christianity really become what according to its own idea it has been from the beginning. Baur's conception of Church history as the history of the evolution of the Christian idea within the Church.

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But this is not the prevalent conception in theology to-day. It has been put in the background by the Ritschl-Harnackian interpretation of Church history which we

might designate as an intensification of the old Protestant pessimism. While according to the latter the Christianity of New Testament times was perfect but degenerated greatly after the apostolic period, so on the other hand according to Ritschl and his followers, the perfect essence of Christianity was exclusively contained in the Gospel of Jesus as portrayed by the first three evangelists; and just for this reason Ritschl believes the man Iesus must be looked upon as God, because he was the only true revealer of the will of God. According to him the corruption and indisposition of Christianity began immediately afterwards, for already Paul had distorted the pure Gospel of Jesus by the intrusion of Pharisaic theology and the doctrine of the sacrament, while it suffered even more by John's doctrine of the divine Word which became flesh in Jesus. The Greek philosophy thus introduced had then so completely effaced and overgrown the purity of the Gospel in the minds of the Church Fathers that the entire Church history was really nothing else than the continuous process of the demoralization and secularization of Christianity, whose true essence was again discovered by the latest theology, namely that of Ritschl. This radical pessimistic judgment to-day is the dominant view of Church history and pretends to count as the final word of modern science.

To swim against so powerful a current is certainly no pleasant task, but it must be done where such fundamental convictions are at stake. I will therefore attempt as briefly as possible to give you categorically the reasons why I can not hold the view of Church history which has just been described.

Above all it seems to me to contradict the system of evolution which otherwise prevails universally in the science of to-day. By evolution we understand the legitimate and destined development in which everything is both fruit and seed at the same time, each single phenomenon being

conditioned by its predecessor and conditioning future ones. If this is true of history as well, then there can be no absolutely perfect point of history which could be made an exception to the universal law of spacial and temporal restriction and limitation of everything that has come into existence. But least of all can any perfect thing be found at the beginning of an evolution series where the constructive new fact is naturally most intimately connected with the old, and its individuality is most imperfectly brought to light: therefore it must gradually evolve out of this initial development together with the former in order to most fully manifest its distinctive features. of course we no longer believe to-day that man already corresponded to his ideal at the time of his first appearance on earth: on the contrary we are convinced that he was farthest removed from this at the beginning, that he was then most deeply submerged in the rough animal nature, and that only in the course of millenniums has he developed to the spiritual freedom which distinguishes him as man. Should then the history of Christianity make an exception to this universal rule which has everywhere been confirmed by experience in the life of nature and of history? Should perfection then form the pure realization of its being at the first beginning, and everything that followed have been only wretched degeneration, senseless confusion and decadence? I confess that this view seems to me to contradict the thinking intelligence which is founded upon the analogy of experience, just as much as it contradicts devout faith in the all-ruling providence of God.

But, some will say, we cannot come to a decision here from general assumptions but only from definite scientifically investigated facts. All right! Let us confine ourselves to facts but to actual and not imaginary ones. Then we will stumble at once upon the doubtful fact that very different answers are given to the question as to wherein

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really consists the Gospel of Jesus with which the essence of Christianity should cover itself. If one glances over the entire literature which has been written on the life of Jesus within the last half century he will receive the impression that the old question of dispute which gave trouble even to the Apostle Paul (2 Cor. xi. 4) is not vet settled in so far as every author commends a different Jesus, a different Gospel, and a different spirit as the only true ones. Must not the opinion be forced upon us that it is finally rather the authors' own spirit, their own gospel and their own ideal of Iesus that they read into the Gospels and with pardonable self-deception consider the result of their historical research? No one will be surprised at this who knows the character of our sources, and who considers that in our Gospels the modifications and several advances of the communal faith have been successively precipitated in layers, lying now on top of one another, now side by side, and have greatly enriched, transformed, embellished into the supernatural, and spiritualized into the ideal the original features of their Christ-conception. Under the existing condition of the sources, none of which date back to the time of Jesus himself, who dares assert with certainty what the historical foundation of this varied traditional material has been,—what Jesus really believed and taught, desired and accomplished? But if the person and Gospel of Jesus is an open question, yes, if it is the most obscure point in the history of Christianity, then the point of departure and the criterion for judgment in regard to the essence and history of Christianity can not be found in it. Because of the difficulty of arriving at a positive conclusion it is of course not impossible to try at least how near we may come to historical probability in these things. I too have made this attempt, and two years ago published the results of my investigations in lectures on the origin of Christianity. I shall take the liberty of referring my readers to the con-

clusions which I made at that time. To-day I will only select this much of that discussion: If anything in the Gospel story can be looked upon as well attested it is this, that the prediction of the approach of the kingdom of God was the heart of Jesus's preaching, and that by that expression he meant the same as his countrymen and contemporaries understood,-namely, the crisis brought about by divine miracle, which would put an end to the present miserable condition of the world and would represent a new order of things for Israel to the advantage of the poor and devout, the early realization of the apocalyptic ideal of the sovereignty of God. This expectation of the approach of the kingdom of God had for its assumption the fundamental pessimistic view that the world as it is to-day is in a Godforsaken desperate condition under the control of the enemies of God, the Devil and demons, whose operations were to be seen in all the ills of the body and soul, and whose instruments, in all oppressors of the pious,-the godless Jews and the pagan Romans. This crude dualism was foreign to the earlier religion of Israel, but had arisen in the last centuries under the influence of the Persian religion and under the afflictions of the political lot of the Jews, as the natural reflex of a pessimistic temper which despaired of reality and looked for the remedy only from the destruction of the present and the beginning of a new world created by divine miracle. From this dualistic pessimistic temper arose the various apocalyptic writings; from this also were produced various Messianic national movements started from religious and political motives before and after the time of Jesus. In the first years of our era Judas Gaulonites had arisen in Galilee and collected a large number of followers around his Messianic banner. Judea appeared John the Baptist with his message of the approaching kingdom of God and with his call to repentance. In his footsteps trod Jesus and repeated literally

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his proclamation of the kingdom of God which was at hand. For this very reason it can not be doubted that he understood by these words the same as did the Baptist and all Jews. Nothing was farther from his intention than to found a new religion, to announce a new God, to overturn the law and the prophets; on the contrary he wished to fulfil them. He was inspired by the belief that the God of his fathers would not delay longer in this time of extreme need to fulfil the promises of the prophets to his people, to put an end to the miserable condition of the world then existing, and to advance the longed-for redemption and deliverance. To prepare the people for this he considered to be his calling as had John the Baptist before him, but the way in which he sought to fulfil this calling was altogether new. He did not strike the threatening note of a sermon on God's fearful judgment day, but that of compassionate, consoling, and uplifting love. He pitied the masses of the people whom he saw mistreated and abandoned like sheep without a shepherd. This distress of his people stirred him to the heart and pointed out to him the way of his prophetic calling. He did not wish to separate himself from the unclean and sinful mass of people as did the arrogant Pharisees and the timid Essæans, nor like Iohn did he retire into the desert and wait until the multitude came to him; but everywhere he followed the people, sought them in the schools on the Sabbath and at their work during the week, permitted himself to be called to beds of sickness in order to heal body and soul by his comforting word, and did not scorn to sit together with the accursed publicans at the common table. This friendliness, the love which seeks and saves, was the new and individual element in the work of Jesus,—a revival of the best spirit of the prophets, of Hosea and Jeremiah, but strengthened by the distress of the time, its deep and feverish apocalyptic tension. In Jesus were closely united the heroic

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faith in the nearness of the saving act of God and his redeeming kingdom, and the force of compassionate love to begin with the salvation and redemption of individuals. With the eve of confiding love he still saw the glimmering sparks of good in sinners who had been cast aside by the righteous; in their longing for salvation he saw its possibility and at the same time the challenge to him who had the power not to quench this flickering wick but to kindle it by compassionate love, by the comforting word and act of healing. On the other hand he used sharp words of criticism and judged the self-righteous who boasted of their external legalism, and were unmerciful towards those less punctilious. Against this system of justification by the works of the law, against the sham religion of external ceremonial practices, purifications, abstinence, and sacrifice, Jesus stepped forth with severe words because to him religion was true only when it sprang from the heart, and was then actualized in ethical activity of the virtuous. This was indeed a new spirit, the kernel of a new religion which is as far above the legalized Judaism as it is above the lawless naturalism of the Gentiles. Both are vanquished by the religion of holy love which judges the sin but redeems the sinner, which recognizes the will of God as unconditional law, but subordinates it to love's own free impulse. In so far it may well be said that in the personally devout temperament of Jesus the religion of the divinity of man, the indwelling of the divine in the human spirit has been present like a germ. Only we must not understand that the new religious principle whose first dawn we may perceive in the saving power of Jesus had already come to a clear conception in his consciousness or to a definite expression in his preaching so that the Gospel he proclaimed would perfectly coincide with the true essence of Christianity. In order to be able to maintain this we would have to close our eyes to the most evident facts.

The fact is that the apocalyptic expectation (which Jesus also shared) of the final coming of the kingdom of God, has for its assumption the crudest dualism between a remote God and the actual world as God-forsaken and governed by diabolical powers,—a dualism which is the opposite of the inner union of God with men, so essential to the Christlike religion of the divinity of man. The fact is that according to the apocalyptic idea of the kingdom of God (which Jesus also shared) it was limited to the Jewish people, therefore Iesus only realized that he was sent to the lost sheep of the house of Israel; the Gentiles are excluded from this kingdom or can receive only such a share in its blessings as the dogs who receive but the crumbs from their master's table. And as this kingdom is a nationally Jewish kingdom so it is also an earthly state of happiness; it promises to the devout as a reward for their present sacrifices the hundredfold enjoyment of corresponding blessings. Such a temporal and eudemonistic hope of reward may be a strong incentive to ethical action, but it is not an especially pure and exalted one. Now it is very clear indeed that this temporal kingdom of God that the Jews looked for is very different from the universal and spiritual kingdom of God of our Christian faith, and this difference could have been so often overlooked, only because we unconsciously read the latter interpretation into the older Gospels (in the Gospel of St. John it had, to be sure, already replaced the earlier conception). It cannot be said that the difference is only one of theoretical conceptions without practical religious and ethical significance. On the contrary the apocalyptic expectation of the early end of this present world and the miraculous crisis of the future one, naturally engendered a feeling of transitoriness out of sympathy with the existing order and labors of human society. Therefore the undeniable ascetic features of the evangelical ethics,—its demand upon renunciation of prop-

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erty, trade, and family ties; its indifference to state, law and culture; all this must have been natural and beneficial for that time of the great crisis and powerful struggle of the new ideal against the ancient world. But how the highest ideal of Christian ethics can be found in this asceticism and hostility to culture is hard indeed to understand. Finally it is an undoubted fact that Jesus has made the spiritualization of the law in the moral sense the most prominent feature, but for this very reason he did not put aside the authority of the whole Mosaic law, but on the contrary confirmed its importance in every iota. He teaches that man should observe the one phase (the ethical) and not neglect the other (the ceremonial). If the Christian Church had persevered in this view of Jesus, it would never have arrived at that independent morality which alone corresponds to the religion of the spirit. It was the service of the Apostle Paul, who to-day is called the perverter of the Gospel of Jesus, that Christianity has become freed from the fetters of the Mosaic law and has become conscious of the freedom of the children of God.

Whoever takes into consideration impartially and honestly this actual charcteristic of the ethics of Jesus and his prediction of the kingdom according to the three first evangelists, will no longer be surprised at the further fact that the object of the faith of the Christian community since its earliest beginning has never been the earthly teacher Jesus, but always and exclusively the divine Christspirit,—either as the Son of man who according to the apocalyptic expectation is to come on the clouds of heaven to establish his kingdom upon earth; or the Son of God and Lord-spirit, who according to Paul was sent down from heaven in human form to save a sinful world by his death and resurrection; or the Logos and only-begotten Son of God who according to John has brought light and life to the world by his advent in the flesh. All of this is

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at bottom only the differently enunciated expression for the personified ideal of the divinity of man in which accordingly the kernel of the Christian faith has consisted from the beginning until to-day. But that this profound idea of the divinity of man which is essentially a general truth realized throughout the whole history of mankind was at first portrayed only in the mythical form of one supernatural miraculous figure existing at one definite time and unique of its kind,—that indeed was a defect, a disguise of the real truth. However it was not at all for this reason a corruption of a better knowledge which had previously existed, but the unavoidable expression of the first childlike steps of the evolution of Christianity;—the figurative integument of the purely spiritual truth. This integument was unavoidable because the new idea of the divinity of man, of the indwelling of the divine in the human spirit, was in entire contradiction to the presupposed crude dualistic world-conception commonly accepted by the entire world of antiquity, Jew as well as Gentile. To reconcile this contradiction, to overcome the ancient dualism not only practically in the imagery of the faith and cult but also theoretically in the sensible thinking of the truth of the divinity of man, that was the problem which naturally could not be solved at one stroke but to the solution of which the whole evolution of Christianity through the millenniums was and still is necessary.

It is incontestable, to be sure, that Greek philosophy cooperated in the solution of this problem, that the thoughts of Platonism and Stoicism, of Neo-Pythagorism and Alexandrianism exercised a more or less direct influence upon Christian theology. Yes, we may go still farther and dare to suppose that even the contemplative wisdom of India also influenced Christianity. Not only the childhood legends of Luke have their conspicuous analogies in the Buddhist and Brahmanistic legends but even

the central idea of the Christian faith, the incarnation of the deity, and deification of humanity, had its home in India, where it was entirely unknown to Judaism and had only the most remote echoes in Greece in single myths and certain philosophical speculations. Granted then that to the origin and evolution of Christianity not only the Hebrew prophets but also the sages of India and Greece have made generous contributions, still I can not understand why this fact should be called a perversion of Christianity. "Is God the God of the Jews only? Is he not also of the Gentiles? Yes of the Gentiles also," said Paul in the epistle to the Romans (iii. 29). Ought we then not to be ashamed to remain so far behind the insight of this apostle that we recognize as divine truth only that which comes from the Iews, but reject all which originates in our Indogermanic ancestors as godless error? I at least confess that to me the former seems much too narrow and paltry a view of the divine revelation and administration of the world when it is limited to the Jewish people, and the noble race of the Indogermanics, our own ancestors, are regarded as entirely God-forsaken and all their profound thinkers and sages are looked upon as heretics outside of the Christian pale.

But now even the influence of Greece upon the Christian Church is looked upon as harmful because its consequences are pointed out in a series of pathological phenomena called by the names of intellectualism, mysticism, and moralism. Now it is my opinion that the intellectual, mystical, and moral (that is, thought, feeling, and volition) belong together as a matter of fact in Christianity as in every religion, but that according to the particular capacity of the individual and the nation now one and now the other side will naturally triumph. In this fact there is nothing pathological in so far only as the tendencies in one direction are complemented by the opposite as was

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always the case in Christianity. The Greeks were preeminently adapted for the intellectual development of Christianity. Was this then a detriment? Or on the contrary was it not necessary if Christianity were to take its place in the ranks of ancient civilizations? If to-day the theologians of Ritschl's school permit themselves to find fault with the Church Fathers because they indulged in metaphysics, they would better first furnish proof that the Christian religion was and still is able to exist without a metaphysical world-conception.

That the Greek theologians were partly in error in their subtle and artistic speculations is of course true, but Greek philosophy is much less to blame for this than the supremely unphilosophical mythology of the faith of the community which at that time was as difficult to reconcile with intelligible thought as it is to-day. Especially must we not overlook the fact that upon the ground of the ancient dualistic world-conception the Christian truth of the divinity of man may be maintained only because it was rescued in the enchanted world of those early days, and was clad in the secret of half mythical, half philosophical dogmas. It remained concealed in this shell until minds were matured enough to comprehend it in its pure and universal truth without this disguise. But meanwhile the devout spirit contrived to make sure of the presence of the divine in immediate feeling and in the symbolical conception of wor-In this way arose "mysticism" without which no living religion can be imagined, least of all that of the divinity of man. But the miraculous, which to be sure still clings to it, in part corresponds to just that childishly immature degree of development which could illustrate the presence of the divinely spiritual only through a sensuous medium; it might be called a disease if one wished to consider the childish absence of distinction between the spiritual and sensuous, as abnormal.

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Finally as far as the censured "moralism" is concerned it can only be found in the objectionable sense where the moral has been severed from all incentive by religious convictions and sentiments. Of this there is no evidence in early Christendom. On the contrary, the development of Christian ethics from the beginning followed in the closest connection and exactly parallel with that of dogmatic thought and cultural mysticism. To the supernatural secret of dogma and ritual of worship corresponded the supernatural sanctity of the ascetics who held that the ideal of a close union with God could be attained only in separation from the godless world and in the annihilation of the life of the senses. The moral power of their asceticism had a purely religious incentive; and if to-day we call the manner of its manifestation onesidedly negative and barren, yet we may not forget that it was surrounded by the decadence of the ancient world and that it took with literal seriousness the evangelistic ideal of perfection.

The Roman world adopted the entire Christianity of the Grecian Church—dogma, worship, and ethics, but added thereto a new and important element. With their hereditary energy and commanding nature the Romans built up Christianity into an organized community of the Church according to the pattern of the Roman state. The heavenly hierarhy of the world of spirits which had its head in Christ was to correspond to the earthly hierarchy which had its head in the Roman Church as its pattern and instrument; and as the God-man of dogma stands above natural humanity, so also stands his earthly organization, the hierarchy of the Church, over the natural world and in opposition to the world as the holy nature is opposed to the sinful, but at the same time with the pretension to dominion over it as the Lord of heaven is supreme over the earth. The striving after the realization of this ideal imbued the Middle Ages. The proof of its unattainableness and harmful Ch

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ful effects led to a rupture with the ecclesiastical form of Christianity as it had previously existed in faith and life.

The Reformation of the sixteenth century was the decisive turning point of the new epoch of Christianity, not a reversion to its primitive form, from whose ascetic ideal the reformers were much farther removed than the Catholic Church had ever been. The crisis affected the kernel of the Christian faith; the divinity of man was drawn out of its ecclesiastical remoteness and supernaturalism to the nearness of man's every-day life. The Germanic temperament felt the direct presence of the divine spirit in its inmost soul, and supported upon this Archimedean point it began to shake the world of the Middle Ages to its foundations. At first the transformation was consummated in the directness of the pious self-consciousness which perceived its freedom in God; then in the reorganization of the moral world, of the family, society and governments, which having become aware of their intrinsic divine worth released themselves from ecclesiastical fetters. Thus the old ecclesiastical ideas of the godlessness of natural man remained unchanged by the supernatural God-man and his one definite work of salvation; but the contradiction between this intellectual union and practical emancipation was not adhered to permanently. So upon the old ecclesiastical Protestantism followed the new Protestantism which in its enlightenment broke with all ecclesiastical dogmas but then again bethought itself of the truth of the Christian religion which had been hidden under the covering of these dogmas in order to realize more clearly and more perfectly than before the truth of the divinity of man in new forms of independent thought and of the moral life of human society. This is the problem of Christendom to-day, as it is stated for us in the natural and completely consistent evolution of the entire history of Christianity.

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EMPEDOCLES; THE MAN, THE PHILOSOPHER, THE POET.*

LIFE.

HE philosopher Empedocles, according to the common tradition of antiquity, was born at Agrigentum in Sicily, and flourished just before the Peloponnesian war, the contemporary of the great Athenians about Pericles. He might have heard the Prometheus in the theatre of Dionysus and have talked with Euripides in the Agora; or have seen with Phidias the bright Pallas Athene on the Acropolis; or have listened in the groves beyond the city while Anaxagoras unfolded to him those half-spiritual guesses at the nature of the universe, so different from his own. He might: but the details of his life are all too imperfectly recorded. The brief references in other philosophers and the vita of Diogenes Laertius contain much that is contradictory or legendary. Though apparently of a wealthy and conservative family, he took the lead among his fellow citizens against the encroachments of the aristocracy; but, as it seems, falling at last from popular favor, he left Agrigentum and died in the Peloponnesus—his famous leap into Mount Aetna being as mythical as his reputed translation after a sacrificial meal....But time

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^{*}The last number of *The Monist* contains a translation of the Fragments of Empedocles in English verse by Professor Leonard, a labor which so far as we know has never before been undertaken. In an article on this prominent Greek thinker our readers will find a clue to the significance of one of the most important philosophical systems of antiquity.—Ed.

restores the exiles: Florence at last set the image of Dante before the gates of Santa Croce; and now, after two thousand years, the hardy democrats of Agrigentum begin to cherish (so I have read) the honest memory of Empedocles with that of Mazzini and of Garibaldi.

PERSONALITY.

The personality of this old Mediterranean Greek must have been impressive. He was not only the statesman and philosopher, but the poet. And egotistic, melancholy, eloquent¹ soul that he was, he seems to have considered himself above all as the wonder-worker and the hierophant, in purple vest and golden girdle,

"Crowned both with fillets and with flowering wreaths;"

and he tells us of his triumphal passage through the Sicilian cities, how throngs of his men and women accompanied him along the road, how from house and alley thousands of the fearful and the sick crowded upon him and besought oracles or healing words. And stories have come down to us of his wonderful deeds, as the waking of a woman from a long trance and the quite plausible cure of a madman by music. Some traces of this imposing figure, with elements frankly drawn from legends not here mentioned appear in Arnold's poem.

WORKS.

Of the many works, imputed to Empedocles by antiquity, presumably only two are genuine, the poems *On Nature* and the *Purifications*; and of these we possess but the fragments preserved in the citations of philosopher and doxographer from Aristotle to Simplicius, which,

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¹From Empedocles, indeed, according to Aristotle, the study of rhetoric got its first impulse. Cf. Diels's Gorgias und Empedocles in Sitzungsberichte d. K. P. Akademie d. Wissenschaften, 1884.

though but a small part of the whole, are much more numerous and comprehensive than those of either Xenophanes or Parmenides. It is impossible to determine when the poems were lost: they were read doubtless by Lucretius and Cicero, possibly as late as the sixth century by Simplicius, who at least quotes from the *On Nature* at length.¹

HISTORY OF THE TEXT.

The fragments were imperfectly collected late in the Renaissance, as far as I have been able to determine, first by the great German Xylander, who translated them into Latin. Stephanus published his *Empedoclis Fragmenta* at Paris in 1573. But not till the nineteenth century did they get the attention they deserve, in the editions of Sturz (1805), Karsten (1838), Stein (1852), and Mullach (1860), which show, however, confusing diversities in the readings as well as in the general arrangement. Each except Stein's is accompanied by Latin translation² and notes. But our best text is unquestionably that of Hermann Diels of Berlin, first published in 1901 in his *Poetarum Philosophorum Fragmenta*, and subsequently (1906), with a few slight changes and additions, in his *Fragmente der Vorsokratiker*.

TRANSLATIONS.

As said above, there are several translations into Latin; all that I have seen being in prose, and some rather loose for the work of distinguished scholars. The late P. Tannery gives a literal French translation in his work on Hellenic Science, Diels in his *Fragmente* one in German, Bodrero in his *Il Principio* one in Italian, and Burnet and Fair-

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¹The writings of Democritus are conjectured to have been lost between the third and fifth centuries.

³ I have not seen the original of Sturz's edition; but I gather from references in my reading that it contains a translation.

banks in their works on early Greek philosophy literal English translations, of which the former's is the better. There is one in German hexameters from the earlier decades of the last century; and a few brief selections in the English hexameters of W. C. Lawton may be found in Warner's Library of the World's Best Literature. Probably Diels does most justice to the meaning of Empedocles; none assuredly does any kind of justice to his poetry.

THE IDEAS OF EMPEDOCLES.

We can reconstruct something of Empedocles's system out of the fragments themselves and out of the allusions in the ancients; yet our knowledge is by no means precise, and even from the earliest times has there been diversity of interpretation.

The philosophy of the On Nature may be considered as a union of the Eleatic doctrine of Being with that of the Heraclitic Becoming, albeit the Sicilian is more the natural scientist than the dialectician, more the Spencer than the Hegel of his times. With Parmenides he denies that the aught can come from or return to the naught; with Heraclitus he affirms the principle of development. There is no real creation or annihilation in this universal round of things; but an eternal mixing and unmixing, due to two eternal powers, Love and Hate, of one world-stuff in its sum unalterable and eternal. There is something in the conception suggestive of the chemistry of later times. To the water of Thales, the air of Anaximenes, and the fire of Heraclitus he adds earth, and declares them as all alike primeval, the promise and the potency of the universe,

"The fourfold root of all things."

These are the celebrated "four elements" of later philosophy and magic. In the beginning, if we may so speak of a vision which seems to transcend time, these four,

held together by the uniting bond of Love, rested, each separated and unmixed, beside one another in the shape of a perfect sphere, which by the entrance of Hate was gradually broken up to develop at last into the world and the individual things,

"Knit in all forms and wonderful to see."

But the complete mastery of Hate, means the complete dissipation and destruction of things as such, until Love, winning the upper hand, begins to unite and form another world of life and beauty, which ends in the still and lifeless sphere of old, again

"exultant in surrounding solitude."

Whereupon, in the same way, new world-periods arise, and in continual interchange follow one another forever, like the secular æons of the nebular hypothesis of to-day.

Moreover, Empedocles tells us of a mysterious vortex. the origin of which he may have explained in some lost portion of his poem, a whirling mass, like the nebula in Orion or the original of our solar system, that seems to be the first stage in the world-process after the motionless harmony of the sphere. Out of this came the elements one by one: first, air, which, condensing or thickening, encompassed the rest in the form of a globe or, as some maintain, of an egg; then fire, which took the upper space, and crowded air beneath her. And thus arose two hemispheres, together forming the hollow vault of the terrestrial heaven above and below us, the bright entirely of fire, the dark of air, sprinkled with the patches of fire we call stars. And, because in unstable equilibrium, or because bearing still something of the swift motion of the vortex, or because of fire's intrinsic push and pressure-for Empedocles's physics are here particularly obscure—this vault begins to revolve: and behold the morning and the evening tell

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ing of the first day, for this revolution of the vault is, he tells us, the cause of day and night.

Out of the other elements came the earth, probably something warm and slimy, without form and void. It too was involved in the whirl of things; and the same force which expels the water from a sponge, when swung round and round in a boy's hand, worked within her, and the moist spurted forth and its evaporation filled the under spaces of air, and the dry land appeared. And the everlasting Law made two great lights, for signs and seasons, and for days and years, the greater light to rule the day, and the lesser light to rule the night; and it made the stars also.

The development of organic life, in which the interest of Empedocles chiefly centers, took place, as we have seen, in the period of the conflict of Love and Hate, through the unceasing mixing and separation of the four elements. Furthermore, the quantitative differences of the combinations produced qualitative differences of sensible properties. First the plants, conceived as endowed with feeling, sprang up, germinations out of earth. Then animals arose piecemeal—he tells us in one passage—heads, arms, eyes, roaming ghastly through space, the chance unions of which resulted in grotesque shapes, until joined in fit number and proportion, they developed into the organisms we see about us. In another passage we hear how first rose mere lumps of earth

"with rude impress,"

but he is probably speaking of two separate periods of creation. Empedocles was a crude evolutionist.²

His theory of the attraction of like for like, so suggestive of the chemical affinities of modern science; his theory

² Some portions of the above paragraphs are translated and condensed from Zeller, some others from Vörländer, *Geschichte der Philosophie*, I. Band, Leipsic, 1903.

of perception, the earliest recognition, with the possible exception of Alcmäon of Croton, of the subjective element in man's experience with the outer world; and his affirmation of the consciousness of matter, in company with so many later materialists, even down to Haeckel, who puts the soul in the atom, are among the most striking ideas of Greek philosophy.

Behind all the absurdities of the system of Empedocles, we recognize the keen observation, insight, and generalizing power of a profound mind, which, in our day with our resources of knowledge, would have been in the forefront of the world's seekers after that Reality which even the last and the greatest seek with a success too humble to warrant much smiling at those gone before.

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THE POETRY OF EMPEDOCLES.

Empedocles and his forerunner Parmenides were the only Greek philosophers who wrote down their systems in verse; for Heraclitus had written in crabbed prose, and Xenophanes was more poet-satirist than poet-philosopher. Lucretius, the poetical disciple of Empedocles (though not in the the same degree that he was the philosophic disciple of Epicurus), is in this their only successor. Contemporary reflective satire and the metrical forms of the Orphics may, as Burnet conjectures, have suggested the innovation; but both Parmenides and Empedocles were poets by nature, and I see no reason why they should not naturally and spontaneously have chosen the poet's splendid privilege of verse for their thought.

The Ionic dialect of Empedocles's hexameters, and occasionally even his phrase, is Homeric; but in mood and manner, as sometimes in philosophic terminology, he recalls the Eleatic. Parmenides had written:

> "And thou shalt know the Source etherial, And all the starry signs along the sky,

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And the resplendent works of that clear lamp Of glowing sun, and whence they all arose. Likewise of wandering works of round-eyed moon Shalt thou yet learn and of her source; and then Shalt thou know too the heavens that close us round—Both whence they sprang and how Fate leading them Bound fast to keep the limits of the stars... How earth and sun and moon and common sky, The Milky Way, Olympos outermost, And burning might of stars made haste to be."*

And it is as if he were addressing the Agrigentine and bequeathing him his spiritual heritage; and we might add thereto those verses of another poet of more familiar times:

"And thou shalt write a song like mine, and yet Much more than mine, as thou art more than I."

For, although Empedocles has left us no passage of the gorgeous imagination of Parmenides's proem, the ίπποι ταί με φέρουσιν, his fragments as a whole seem much more worth while.

He was true poet. There is first the grandeur of his conception. Its untruth for the intellect of to-day should not blind us to its truth and power for the imagination, the same yesterday, to-day and perhaps forever. The Ptolemaic astronomy of Paradise Lost is as real to the student of Milton as the Copernican to the student of Laplace, and an essential element in the poem. The seven circles of the subterranean Abyss lose none of their impressiveness for us because we know more of geology than the author of the Inferno. The imagination can glory in the cross of Christ, towering over the wrecks of time, long after the intellect has settled with the dogmas of orthodoxy. And an idea may be imposing even for the intellect where the intellect repudiates its validity. A stupendous error like the Hegelian logic of history argues greater things for

^{*} Parmenides, fr. 10, 11, Diels, FV.

¹ Diels, FV. Arnold has borrowed from it one of the best lines of Empedocles on Aetna:

[&]quot;Ye sun-born Virgins! on the road of truth."

the mind of man than any truth, however ingeniously discovered, about the cat or the cuckoo. And the response of the soul is a poetic response, the thrill and the enthusiasm before the large idea. The poet's conception is impressive to imagination and intellect: we stand with him amid the awful silence of the primeval Sphere that yet exults in surrounding solitude; but out of the darkness and the abyss there comes a sound: one by one do quake the limbs of God; the powers of life and death are at work; Love and Hate contend in the bosom of nature as in the bosom of man; we sweep on in fire and rain and down the

"awful heights of Air;"

amid the monstrous shapes, the arms, the heads, the glaring eyes, in space, and at last we are in the habitable world, this shaggy earth, this sky-roofed cave of the fruitful vine and olive, of the multitudinous tribes of hairy beasts, and of men and women,—all wonderful to see; for Empedocles is strikingly concrete. But the æons of change never end; and the revolution, as we have seen, comes full circle forever.

There is too the large poet's feeling for the color, the movement, the mystery, the life of the world about us: for the wide glow of blue heaven, for the rain streaming down on the mountain trees, for the wind-storm riding in from ocean, for

"Night, the lonely, with her sightless eyes,"

for the lion couched on the mountain side, the diver-bird skimming the waves with its wings, and

"The songless shoals of spawning fish"

that are

"nourished in deep waters"

and led, it may be, by Aphrodite.

There is the poet's relation to his kind, the sympathy with

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"men and women, the pitied and bewailed,"

who after their little share of life with briefest fates

"Like smoke are lifted up and flit away;"

the interest and delight in the activities of man, how now one lights his lantern and sallies forth in the wintry night; how now another mixes his paints in the sunlight for a bright picture of trees and birds which is to adorn the temple; how now a little girl, down by the brook,

"Plays with a waterclock of gleaming bronze."

There is the poet's instinct, for the effective phrase, that suggests so much, because it tells so little; an austere simplicity that relates the author by achievement to that best period of Greek art to which he belonged by birth; and a roll of rhythm as impassioned and sonorous as was ever heard on Italian soil, though that soil was the birth-place of Lucretius....But I am the translator, not the critic, of the poet.

WILLIAM ELLERY LEONARD.

MADISON, WIS.

THE HEREDITY OF THE UPRIGHT POSITION AND SOME OF ITS DISADVANTAGES.

M AN may be considered the only one of the higher animals capable of adjusting the condition of his surroundings to his needs or taste. The method of attaining the desired end is prompted by physical discomfort or psychical appreciation. The brain itself feels nothing and is therefore considered a sort of second self—more or less removed from the physical man both in popular conception and psychological teaching. The anatomists and physiologists however regard the brain as one of the physical organs direct in its relation to the structure and function of the body community—a relation lost even if self-evident in the maze of the probable physical side of thought.

It is man's knowledge—the development of his brain—that determines the adaptation of his environment. The physical man, the long-suffering house the brain lives in, is merely a convenient mechanical accessory to the mental self, and should this physical element in man force itself upon his consciousness, the inconvenience of a body is evident. The separation of man into brain and body! Whence came it?

We have little information concerning our remote ancestor to whom we generously apply the term "the" missing link, except that he was once not as high a form of animal as he is now, and that he was very hairy and surprisingly like the ape. He was possibly a recurring muta-

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en an do tion or sport upon some simian limb—different from his brothers in that his brain was a little better developed. Just as men of to-day with exceptional brains distance their less gifted fellows, so this man—let us assume by his recurrence—developed a new type of animal bearing all the evolutionary evidences of his ancestry, possessed of a better thinking apparatus and because of it more able to survive and select among his kind those more fit. We can safely infer that the progressive evolution of man was due to his peculiarly advantageous relation of gray to white matter and that as the brain advanced the body followed at a respectful distance.

It is probable that this relatively gifted prehistoric being found it desirable to assume the permanent upright position as opposed to the semi-upright for the following reasons: In restricting locomotion to his hind legs and abandoning his arboreal habits, he freed the front legs and could use them entirely for prehensile purposes—organs well adapted to such variation in function and entailing little structural change. He was already endowed with sustained binocular vision as are all the primates, and had outgrown the nocturnal habits of the immediately preceding line of animals represented by the prosimian (half-apes of Madagascar).

The development of his front legs for prehensile purposes led to the acquirement of hand-dexterity, which is not hereditary but trained as every parent knows. Here his binocular vision troubled him first (and it troubles him more at the present time) because he began to apply the dexterity of his hands to that expression of brain development which tended to raise him higher and make him less dependent on his surroundings. He began to adapt his environment to himself in the fashioning of rude garments and in the manufacture of implements both warlike and domestic. He trained a convergence of his eyes in order

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that he might meet this self-imposed condition and to translate them from purely distance organs to structures that could see equally well near by and far off (contact-distance organs). This acquirement of accomodation shows its recent advent negatively in that it is about the first thing lost in the degeneracy of old age—the far-sightedness of the person over forty-five years.

Growing intelligence led to the transmission of more and more complicated ideas to other individuals in speech, whether gesticulation, spoken, pictorial or written.

These then are the few things in which egotistic man excels the animals: primarily the character of his brain development; secondarily, the maintenance of the upright position, the acquirement of hand dexterity, development of the accommodative apparatus in the eyes and training their convergence (cross eye); and lastly, in intelligent articulate speech. It is a fact, generally speaking, that those things last acquired are first lost, and those things first acquired are last lost; illustrated positively in that the baby walks before it talks, or even more completely in a purely negative manner. The person depressed by an anesthetic such as chloroform or ether, or in the gradual onset of drunkenness loses his faculties in about the following order: first, self-restraint or any and all of the finer sides of human nature last acquired; speech next becomes more or less incoherent; balancing becomes difficult; speech is reduced to noises before the individual returns to allfours; vision is next lost, and when gone hearing soon follows; complete unconsciousness.

That our mental development is far in advance of our physical is illustrated nicely if we but compare the average man of to-day with say the mound builder. Our intelligence as the last acquired attribute is undoubtedly very plastic and capable of much variation in development. That it is the active factor in our advance is shown by an

example such as this: Major C. E. Woodruff, U. S. A., found that the element of danger to the white man in the tropics was not the heat but the intense light. Enter knowledge of the conditions and specific intelligent adjustment of the environment to the white man who is recommended to wear white outer clothing, and dark—preferably black—underwear. Adaptation of the surroundings to a type of man who is not provided with sufficient pigment in the skin (melanin) to meet the conditions.

Thus intelligence daily exhibits those characteristics which have enabled us to survive in the struggle for existence. Just as our brain-development was the probable cause of our ascent so our brain-development may eventually cause our decline. Intelligent people select intelligent people—the brain-development is set at a premium—and ultimately the relation of the child's head to the birth-canal of the mother may be so disturbed that the life of the mother may be jeopardized in the fulfilment of nature's second law, if the child can be born in a viable condition. The physician is one of the greatest enemies to progressive evolution in the animal sense in that he is assisting in the selection (artificial) of those individuals who would be eliminated under normal (animal) conditions.

The last remark may appear to substantiate an erroneous and popular notion that the laws of "animal" evolution do not obtain for "man." The writer took exception to an article which was an open recommendation to mothers to bring their babies up on the bottle from the start and based on the premise that nature (save the term!) is doing away with the breast function. The breast is the last acquired sex organ; last acquired things are lost first in degenerative changes, and under normal conditions those babies that could not be nursed would die and the depleted stock be eliminated. Should we continue, as we must, to

select those individuals bred from a stock that cannot nurse its young, it is not unlikely that the genital function will be suppressed (sterility).

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Our brain-development may therefore lead us to four possibilities: (1) a return to a more or less normal relation of mental to physical development (the alleged inferior class); (2) elimination of those individuals possessed of too large a head (over-development); (3) elimination (prolonged by unnatural selection) of those individuals bred of a stock that cannot nurse its young; and (4) race suicide of the so-called higher classes.

The maintenance of the upright position was mentioned first among the secondary factors that contributed to man's ascent. First, because it was essential to a freeing of the hands and to the application of growing ideas. Without it nothing would have been accomplished and it must therefore be considered the second most important human attribute. Our hands after all are not unlike those of our far-removed cousins the apes. The chief difference apart from technical muscle separations is found in the thumb. This digit is a relatively short member in the ape and is tied down rather firmly to the side of the palm. The amount of opposition is poorly developed and other than in its length it resembles that of a child closely. A baby does not pick up an object off the table between the thumb and first finger at first, for such coordination of muscleaction (opposition of the thumb) is acquired and not hereditary. Rather it reverts to the monkey fashion and gradually draws the object to the edge of the table that it may clench its fingers about it. Later the infant trains an opposition of the thumb and learns that it may touch the base of the little finger with ease—a feat impossible in the highest ape. The sense of "feeling" is much better developed in other animals, but the sense of "touch" (popular

meaning) is after all muscle control mainly of the thumb and index finger.

It has been stated that "man climbs his own ancestral tree" (Milnes Edwards) and that he carries on his person unmistakable evidences of his ancestry. Whatever the intrinsic or extrinsic factors may have been which prompted our remote forefather to assume and maintain the upright position, this much is true,—that despite the myriads of years he has spent in readjusting himself to the self-imposed and unnatural posture, it has been far from complete and will probably always remain imperfect. The upright position has many disadvantages—irreparable in the deficiency of adaptation—factors that even tend to eliminate the physical man—prima facie evidences of evolutionary development as opposed to divine creation.

Let us limit our attention to the three most important functions in animal life; respiration, or the obtaining of the necessary oxygen; digestion, or the obtaining of required water and food; and procreation, the perpetuation of the species. Let us remember that not only lack of adaptation to false position is of disadvantage but that the force of gravity is directed at right angles to what it would be were we on all-fours. Let us assume that it is the object of the writer to prove that not only is the adaptation to position mechanically faulty but that the individual is actually laboring under other evident disadvantages. Many conditions that carry people to the hospital daily must be omitted and no effort toward anything more than a few facts will be presented.

RESPIRATORY TRACT.

The vertebral column in the animal is placed about on the horizontal. The trunk is supported by four legs and the weight carried by the front legs is transmitted to more or less vertical ribs. Respiration in the animal, like that in man, is of two types—costal and diaphragmatic. Costal respiration is accomplished by swinging the vertical ribs forward—a movement not affected by gravity and requiring but little effort—for inspiration, and relaxing the muscles for expiration. Diaphragmatic breathing results from contraction of the diaphragm and horizontal displacement of abdominal viscera toward the tail, with passive return on expiration.

The assumption of the upright position resulted in several things. The support of the front legs was lost and they in turn are carried on ribs now placed horizontally. In costal respiration not only must the ribs be lifted against gravity but some of the weight of the upper extremity elevated as well in inspiration while expiration is assisted: the traction of the abdominal muscles, now used for balancing, must also be overcome. In diaphragmatic respiration, the increased intra-abdominal pressure (flat abdomen characteristic of man) must be counteracted. Partly as a result of this we find a difference in the type of respiration in man. The breathing is costal in character in either sex when asleep (more or less animal-like); when awake however it is subcostal and diaphragmatic in the male, while in the female it remains about the same (costal). Why now should the type of respiration in two sexes suddenly change (and daily) when "they get up on their hind legs?" Let us consider some of these reasons before passing to more or less direct results of the assumed posture on the respiratory tract.

The male as a rule is the more active. His activities tend toward greater development of the abdominal muscles used in balancing and consequent interference with costal respiration. Not only is the relatively greater weight of his upper extremities transmitted to horizontal ribs, but the use of his arm, especially where strength is demanded, necessitates a fixation of the upper five or six ribs, and res-

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piration is confined mostly to the diaphragm. The fact that this type is acquired shows itself in the return to normal when asleep.

The type of respiration in the female remains the same because she more nearly approaches the animal type in that she does not carry as great a weight on her upper ribs and that she does not need arm-strength with fixation of the upper ribs; more important, however, is the amount of abdominal room required for the gestation of offspring where abdominal breathing would be markedly interfered with; and the third and least important reason is due to the control of any abdominal expansion by the corset. Should any woman doubt this, let her lace a little tight to exaggerate the experiment, take a pail of water in each hand (fixation of the upper ribs) and walk say up two flights of stairs. She will find the greatest inconvenience is not in carrying the weight but in breathing.

There is a tendency due to change in position (gravity) to make inspiration more difficult and expiration unnaturally easy, and as a result we hold our chests poorly expanded. Well illustrated is the so-called good chest expansion say by an example (centimeters are used instead of inches, because they illustrate the point better and the chest-expansion given is abnormally large—exaggeration).

Given a man with chest normal, 90 cms.; expanded, 100 cms.; and contracted, 85 cms.: the relation of 10 cms. expansion to 5 cms. contraction when compared with normal. Physiologically speaking this individual holds his chest one third expanded. Given another man with similar maximum and minimum, 100 and 85 cms. respectively, but who holds his chest at 95 cms. The latter keeps his lungs relatively two-thirds expanded. The former type of chest is a poor chest and common; the latter is a good type and rare. The frequency of the former type is due

to the fact that the upright position is disadvantageous to proper lung-expansion, and for this reason children should be taught to "throw the chest out and the abdomen in"— an effort that ought to become a habit. Well what of it? What if we do not hold our chests well expanded?

We all know that we are breathing in germs all the time. Most of them are innocuous, some of them death-dealing (tubercle bacillus for example). The unexpanded areas of the lungs are weaker in that they are not exercising a normal function and here the tubercle bacillus has a better chance to lodge and multiply. For this reason tubercular nodules are found in the upper poorly expanded apices of the lungs so frequently that it is almost normal. Were it not for adaptability, more of us would be affected; as a matter of fact few of us escape infection which is walled off—no thanks to our mechanical defect in posture.

DIGESTIVE TRACT.

The digestive tract in the animal is attached to the back wall of the abdomen by a thin serous membrane known as the peritoneum. The membrane, however, is merely a lubricator, carrying between its layers vascular structures to and from the tract. The force of gravity tends to bring the viscera in apposition with the horizontal abdominal wall where they are supported. When the animal has eaten heartily, it rests, and lies down with its digestive tract indirectly on the ground.

The upright position hampers the digestive tract in many ways. In order that the individual breathe properly he must "throw his chest out and abdomen in" and crowd the already cramped tract against a curve in the vertebral column thrown to the front to compensate for the unnatural position. The peritoneum must now be used as a support, and about twenty feet of small intestine is hung from a vertical abdominal wall by this thin membrane,

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attached for a distance of say even five inches. The result is that the small intestines crowd down into the pelvis and against the weakest part of the now vertical front abdominal wall. Apart from this tendency toward dislocation, they may even come through the abdominal wall in the form of a rupture or hernia. Eighty-five per cent. of these ruptures (conservative estimate) are due to the upright position (gravity) and to irreparable faulty adaptation of the viscera to withstand the traction. The same is true of other abdominal viscera.

The digestive tract as the one great tract under the direct control of our intelligence is naturally long suffering. We probably eat too much and our habits are such that we do not rest after meals as the animal does but try to keep an excess of blood in two parts of the body-for digestion and for muscular effort or brain work at the same time. The consequences are evident to anyone who has gone in swimming or has tried to be particularly brilliant after a hearty meal. In the former case it is probably headache; in the latter instance, sleepiness. This is one of the strongest pleas for the after-dinner cigar or cigarette-it requires no effort and keeps the smoker quiet. Jokes after a Thanksgiving dinner are not appreciated; either the company is too dull (lack of blood in the brain) or it hurts them to laugh. This hurting to laugh is due more to increased weight of the digestive tract than to distension as such individuals are surprisingly comfortable when lying on their "stomachs." Reversion to animal position.

REPRODUCTIVE SYSTEM.

Every fit animal arrives at the period of maturity that it may exercise the procreative function—a general zoological law with some modifications. When the male and female have completed their natural mission in life they die. In some cases the life of the male is sacrificed in the

act (bees); often the female lives only long enough to lay the eggs (moths); or the animals live beyond the procreative period for a certain length of time when degenerative stages set in and the animal is no longer fitted to cope with the environment.

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The chief disadvantage of exercising the procreative function in man is mostly mechanical (lack of adaptation to the upright position) and therefore found in the female. Disadvantages also arise from a psychical source—exclusively human and un-animal - and due to intelligence. During pregnancy the mechanical accessory to the brainthe body-becomes seriously inconvenienced and evident. It interferes with what the possessor wishes to do, and hence the attempt is made on the part of homo sapiens to eliminate himself: (1) by prevention of conception; (2) by mechanical interference with pregnancy; (3) by restriction of the number of children; and (4) by refusing to accept the responsibility of having children. The last named reason is wholly worthy and a necessary accompaniment of false surroundings (domestication in the animal sense). The third point probably results from the desire of every parent that the children shall not only have the best chance but excel. The writer believes judgment should be reserved in such cases. Nature counteracts all of these strictly human characteristics very adequately in declaring such individuals unfit.

The disadvantages of the physical side are due to the fact that we are standing on our "hind legs." The abdominal room is cramped at best, and the vertically placed front abdominal wall gives poor support and does not distend well. So far the two important tracts of respiration and digestion have not seriously been incommoded. The increasing weight of the offspring, however, is of great disadvantage in the upright position. The pressure is directed against veins which themselves are working against

the "head" due to translation in function. The pressure symptoms against the veins and nerves, particularly those of the lower extremities, interferes with their proper nutrition and in extreme cases gives rise to the so-called varicose veins, etc. Placed under normal animal conditions the helplessness of the pregnant human female would be eliminating. Compare the condition of the pregnant woman with that of the female animal which may carry even a greater proportionate weight of progeny, and compare again their physical adaptation to their respective conditions. The facts (natural conditions—in error—if you like) arraign themselves entirely against man, and he is forced to exhibit great intelligence to make even a good showing.

When man and woman attain a certain age (more definite in the female—about 45 years) the genital function is suppressed;—an evidence of the down grade on the curve of life and a beginning, physiologically speaking, of senility. It is at this stage that the animal is eliminated. The human being has increased his span of life gradually by counteracting degenerative changes, but he has not increased the useful period. Rather the increase in life, prolongs the period of senility by skillful adjustment of the environment (false teeth, dieting and what not). This period equals roughly one-third of human existence and in the majority of cases is not very productive.

It is not the writer's purpose to present a calamity oration or to attempt the superhuman and offer any suggestions as to what may be done. Rather to give food for thought and to convince the more egotistic of our number that we are far from perfect. To say that we would be better off on all-fours would be absurd. We have adapted ourselves imperfectly, and while we labor under distinct disadvantages, our progressive advance refutes any idea that we are withal a degenerative stock. It hurts no one

to realize that he has an ancestry, that his Genesis has been Evolution, that he suffers inconveniences because his remote forefather assumed the upright,—rather he appreciates more nearly the ideal man, even if he be burdened with imperfections transmitted to him by a long line of forbears.

Augustus Grote Pohlman.

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AVESTA ESCHATOLOGY COMPARED WITH THE BOOKS OF DANIEL AND REVELATION.*

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[CONCLUDED.]

RESURRECTION.

Aside from the actual occurrence of such ideas as the number seven when applied to the Archangels of the Avesta and to those mentioned in the Exilic Semitic documents above cited, together with the other similar matters noted, nothing has been considered more effective for the establishment of analogies between the Exilic Bible and the Avesta than the passage Daniel xii. 9: "Many of them that sleep in the dust of the earth shall awake, some to everlasting life, and some to shame and everlasting contempt."

The antecedent passage to it is in Isaiah xxvi. 19, and the strongest sequent is that of the well-known place in Rev. xx. 12. This recalls at once a dominant element in Zoroastrianism.

a. Resurrection in the Gātha.

In the Gāthas attention is rather turned to human immortality in the light of accountability, making them the earliest consistent documents of such a belief in a civilized literature, while corporeal resurrection is for the most part only implied throughout, as if it were regarded as a sec-

^{*} For the most part delivered in university lectures.

ondary matter. See, however, the expression "forever in the Druj's home their bodies lie." Here my colleagues, however, have laudably suggested another cast of meaning—"forever they are citizens of the Druj's abode." But the Sanskrit ast'i which renders an ast'ayah (= "bodies") probable, corresponds well with Avesta astayo (ast'ayah) ="bodies," and "bodies," i. e., "persons." "Bodies in the house" is, I think, a more probable rendering than "citizens," particularly as the Druj's abode is equivalent to "Hell." "Citizens" of itself is a "good" term in Avesta just as the word for "augmentation" of itself almost implies "holiness," in ancient Parsi conceptions. "Citizens of Hell" is not therefore of itself a natural Avestic expression; for without further explanation we should understand the word "citizen" to imply normal good character,* so that my rendering above cited remains the most rational. and affords us the idea of "bodies" in the future world as does the later but still genuine Avesta; moreover, the evil souls receive evil food, endure darkness, hear evil speech, all of which, unless wholly figurative, implies bodily organs; and last of all it is a law of exegesis that the most objective rendering should be first suggested.

The Frashakart in the Gātha, like the idea of the Ameshaspends, is so real, that it, like them, has not yet secured a quasi-technical name there; so that we cannot pointedly bring it in; but this signal group of thoughts interpreted by the later Avesta implies a corporeal resurrection.

"May we be like those who bring on this world's perfection," alludes to the future millennial or ultimate beatific state, as to which see below. b

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^{*}This is a distinction of the utmost critical importance. Many expressions in ancient books so notoriously convey the impression that the ideas involved in them were of themselves "favorable" and "affirmative" that we are almost at times constrained to restore an apparently improbable text in a sense adapted to this important characteristic.

¹The terms Amesha spenta do not occur in the Gathas, appearing first in the next earliest pieces.

b. Resurrection in the Later Avesta.

In the later Avesta we lose the dignity of the Gātha, but we gain more detail and color; see such passages as "we sacrifice to the Kingly Glory which shall cleave unto the victorious Saoshyant (the One about to benefit, or to 'save') when he shall make the world progress unto perfection."

Note again that this passage, although considered to be "late," has not yet reached that period when this last idea of "progress to perfection" was represented by an especial name, a technical "Fraskakart"; for it is again clothed in language which still possesses internal significance of a fully vital character; as much so as in the freshmaking" of Yasna XXX. See Yasht XIX for the further form and color, "where it, the world, shall be never dying, not decaying, never rotting, ever living, ever useful (profitmaking), having power to fulfil all wishes [a characteristic expression, meaning that 'the world's inhabitants will then be dominant'], when the dead shall arise and immortal life2 shall come, when the settlements shall all be deathless." See also fragment V of Westergaard: "Let Angra Mainyu, the Evil Spirit be hid beneath³ the earth; -let the D(a) evas disappear;—let the dead arise, and let bodily life be sustained in these now lifeless bodies." Notice the absolute impossibility of merely "old age" as the meaning of "immortal" here.

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² This passage has always been held by thorough scholars to follow the Gāthas by a few centuries, but a tendency has been lately manifested to place the later Avesta some centuries after Christ, and this while the Gāthas themselves are still firmly held to be at least somewhat older than the Achæmenian inscriptions. But this would be to place a vast interval of time, more than a thousand years, between the original Avesta and its sequents, which seems to me to be rather irrational. The later Zoroastrianism is however a different matter. That of course post-dated the later Avesta, which intervenes between it, the later Zoroastrianism, and the Gāthas.

^a Notice that Hell was downward.

c. In the Later Zoroastrianism.

In the Bundahesh, chap. XXXI, we have as follows: "On the nature of the resurrection it says in Revelations (referring formally, as we see, to once pre-existing documents as current lore....) that....in the millennium of Hushedarmāh (a supernaturally born posthumous son of Zarathushtra) the strength of appetite will diminish; they will first desist from meat and then from milk, then from water; and for ten years before Saoshyans they remain without food and do not die."

We notice at once the degeneration in the delineation from the terms of the genuine but later Avesta, how much more from that of the Gathas. "After Saoshyans comes they prepare the rising of the dead; as it says that Zartūsht asked of Auharmazd thus: 'Whence does a bodily form come again; and how does the resurrection occur?' [Compare the expression 'with what body do they come?']-And Auharmazd answered thus: 'When through me the sky arose from the substance of the ruby [it was supposed to be stony coela ruunt; cp. Y. XXVIII], and yet supported without columns, [see Y. XLIV, avapas toish] on the spiritual support of far - compassed light [was fire also thought of?], - when through me the earth arose which bore the material life, and there is no maintainer of the worldly creation but it,—when by me the sun, moon, and stars are conducted in the firmament of luminous bodies;—when by me corn was created, so that, scattered about in the earth, it grew again and returned with increase; ['thou sowest not that body that shall be but naked grain'],—when by me color of various kinds was created in plants [flowers]; — when by me fire was created in plants [vegetable caloric] without combustion;—when by me a son was created and fashioned in the womb of a

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See S. B. E., Vol. V, pp. 120 ff.

mother and the structure severally of the skin, nails, blood, feet, eyes, and ears and other things was produced.... each one of these, when created by me, was herein more difficult than causing the *resurrection*, for it is an assistance to me in the resurrection that they exist, [i. e., they exist actually on in their dissolution, resurrection being merely their re-construction]; but when they were formed it was not the forming of the future out of the past, [as the resurrection will be], and so it, the resurrection, will be less formidable as an undertaking than the original creation.

"When that which did not at all previously exist was then produced, at the creation (out of nothing) why is it not possible to produce again, [re-construct] that which was come in an existing body; for at that time, the time of the resurrection, one will demand the bone from the spirit of the earth, i. e., from the dust [recall Ezekiel 'bone to his bone,' also Daniel's 'rising from the dust | the blood from the water, the hair from the plants, and the life from the fire, since they were delivered to them in the original creation [at death]. First the bones of Gayomard [the Iranian Adam] are raised up ['the dead in Christ shall first arise'], then those of Mashyoi and Mashyoi, [the first human pair], then those of the rest of mankind. In the fifty-seven years of Soshyans, they prepare all the dead, and all men arise [stand up], whoever is righteous and whoever is wicked, every human creature ['I saw the dead, small and great, stand before God'];—they rouse them up from the spot where its life departs. Afterward when all material living beings assume again their bodies and forms, then they assign them each to a single class. Of the light accompanying the sun one-half shall be for Gayomard ['there is one glory of the sun'] of the stars ['Another glory of the stars'-'one star differs from another star in glory']; and one-half of the light will give enlightenment

among the rest of men, so that the soul and body will know that is my father and this is my mother,....etc."

The Bundahesh is a very prominent work among the later Zoroastrian documents, and, as just implied, it post-dates Christianity by some hundreds of years. But the expressions in Plutarch already alluded to, seem to indicate the prevalence of an almost exactly corresponding tone of thought as that of this later Zoroastrianism even as early as 100 to 300 B. C., and this strong eschatology is homogeneous in an unbroken chain with that of predecessors to the time of the Gāthas, whereas the Jewish doctrine of the later days was an innovation of the time of the Exile intended to console the captives who had lost their homes and their property; see above. The same remark applies to all other post-Christian Zoroastrian doctrines.

THE JUDGMENT IN DANIEL AND IN THE EXILIC AND POST-EXILIC THEOLOGY IN GENERAL; SUBJEC-TIVE RECOMPENSE.

The next most important particular which demands attention would be the Day of Judgment, or rather "a day of judgment"; for, as this feature occurs in Daniel, it was primarily judgment upon the Beast (see Daniel vii. 9-14) who had persecuted the saints; see it supplemented by Revelations where the same original motive of vengeance is present, but where the act itself is represented as universal upon an assembled and risen mankind. So far as imagery is concerned, the Zoroastrian pales before its sequent, though Zoroastrianism shows a superior refinement and depth in one supreme particular; for not only does it concern itself more immediately and chiefly with the moral accountability and the future state than other systems of its date, but it offers the first well-certified occurrence of the great and crucial doctrine of Subjective

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Recompense, the idea that "virtue is its own reward, and vice its own punishment"; see below. Its awards were not exclusively of this character, and it might possibly be doubted whether the idea focussed itself in the thought that the fact of being "a sinner" was itself actually the doom and execution, or whether it first meant to suggest that the particular sins were in a way figuratively the personified executioners; but it is obvious that the one idea was not at all so very far distant from the other, and that the first was certainly foreshadowed in the last and that indeed it inevitably led on the mind at the next step to it. Subjective recompense was also not of course the whole of the Zoroastrian Heaven and Hell; but it was the soul of them,—and this might be said to be almost the crowning glory of this entire scheme, curious as such a statement may at first sight of it appear to some of us to be.

a. The Judgment in the Gātha.

In Y. XLIII, 4 we have: "For so I conceived of three as August [with others 'as Holy'], O Ahura Mazda, when I beheld Thee as supreme in the generation of life; when as rewarding deeds and words Thou didst establish evil for the evil, blest rewardings¹ for the good² by Thy just virtue³ in the creation's final change.⁴ (6) In which (last) changing Thou shalt come and with Thine August Spirit [others, 'and with Thy Holy Spirit'] and Thy Sovereign Power, O Ahura Mazda, by deeds of whom the settlements are furthered through the Righteous Order (of Thy Law);

¹ Hardly "riches" here.

^a Notice the laws of judgment established from the foundations of the world, spoken of as if seen by reflective vision directed upon the original creation. Or are these preterits to be read in the sense of futures expressed in the sense of the improper conjunctive?

^a I prefer the original meaning in this ancient passage—as expressing the "justice" rather than the "wisdom" of God, for in the next verse "the omniscience" is given.

[&]quot;Revolution" is hardly the meaning here; "the turning" was an expression for "the end,"; see other passages.

and (saving) regulations likewise unto these shall Aramaiti offer [Angel of the ready will],—yea laws of Thine understanding which no man may deceive." In another key of rhythm in the Gātha Ahunavaiti we have at Y. XXX, 4:

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"Then those Spirits created as first they two come together life and our death decreeing, and how the world at the last shall be (ordered). For the Evil (as Hell) the worst life, but for the Holy the Best Mental (state)...."

(8): "Then when Vengeance comes, Vengeance just upon the wretches..." (10) "There on the Host of the Druj the blow of destruction descendeth, but swiftest in the abode of the good Mind gather the righteous; with Mazda and Asha they dwell, advancing in their good fame."

Y. XXX, II: "When long is the wound of the wicked and blessings the lot of the saint."

Y. XXXI, 17: "And what debts are paid in justice for the offering of the Holy.—What is the wicked's debt, and their portion what in the Judgment?"

Y. XXXI, 21: "He who deceives the saint for him shall at last be destruction—long life in the darkness his lot, vile his food, with revilings loathsome;—These be your world, O ye foul. By your deeds your own soul will bring it."

XLVI, 7: "Karps, yea, and Kavis are with foul kings joining, deeds which are evil with man's better life to slay;—cursed by their souls and selves, their being's nature, when from the Judgment's Bridge (they fall, the final pathway);—Ever in Demon's home—their bodies⁷ lie."

⁸ His judgment is infallible.

Reproduced in the later Zoroastrianism.

More literally, "The K. and K. will join and with evil Kings, with evil rites and deeds, to slay the human life, whom (their) own souls and their own conscience will shriek at when they come where the Judgment Bridge (extends); for ever to all duration—their bodies, (lie) in the Druj's Abode."

XLIX, 11: "Then evil rulers, evil-doers, evil speakers, those believing ill, and false men evil-minded, with evil food⁸ the souls to meet are coming. In Druj's home at last their forms⁹ (abide)" [or "in Falsehood's home at last the citizens(?) (they are)"].

Y. LI: "He who than good better giveth, He who renders rewards for religion—is Ahura Mazda in His sovereign power; but He gives him worse than the evil—who does not impart offerings to Him—in the last end of the world."

Y. LI: "What satisfaction thou shalt give through Thy red flame, O Mazda, give as a sign¹⁰ through the melted bronze [through the lake of fire] for both the worlds, [see verse 6] as an indication [or "implement"] for the wounding of the faithless and the prospering of the saint."

These may suffice as expressions from the old Avesta, the Gāthas.

b. Judgment in the Later Avesta.

In the later Avesta at Vendidad XIX, we have: "O Maker of the material worlds, Thou Holy One, where are the awards given? Where does the rewarding take place? Where is the awarding fulfilled? Whither do men come for the reward which in their life in the material world they have made good for the soul?"

Some of the more dramatic features of the supernatural judicial scene which appear in our Holy Scriptures are absent from the Avesta, or have perished from it; —yet this is again made up by the extraordinary subjectivity, which is present everywhere; for in answer to the above the soul seems to judge itself, justifying or con-

^{*}This is a fragment of the original of Yasht XXII.

Or "as citizens(?) they are"; see above.

¹⁰ So I now think to be possible in view of the Bundahish; see above.

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demning itself in the same manner as we have just seen in the Gāthas, though this occurs on the sadder side of the matter, but even pleasing dramatic features intervene in this case in the later books Vendidād and Yasht XXII. For it, the soul (V. xix, 115) is met on the Chinvat Bridge, or at its entrance, by its own counterpart and is questioned by an image representing its conscience. A welcome which recalls the most touching passage in St. Matthew, (xxv. 36-37), meets it. It then proceeds upon its path toward the summit of Hara Berezaiti, (High Mountain), the name still surviving in Elburz in the territory at the southwest corner of the Caspian till a late period.

There the soul comes before the golden throne of Vohumanah, who strangely enough represents the "Holy Man" like the "Son of man" in the Gospels; see above;—and he, Vohumanah, is also indeed the Good Mind of God and of His saints personified, recalling our doctrine of the divinity of Christ, which represents Christ as being both God and man. He rises from his seat and greets the approaching saved man. One of the faithful beside Vohumanah, full of concern, asks him: "When didst thou come from that transitory world to this intransitory one? how long was they salvation?..."

The passage is of course a mass of fragments and we are left without his answer, though Ahura courteously intervenes with the remonstrance: "Ask him not of that cruel way..." The soul then passes on "contented," that is to say, beatified; "to the golden throne of Ahura Mazda—and to the golden thrones of the bountiful immortals, even to Garodmana, Heaven, the abode of sublimity or song, to the immortals and Ahura's home."

c. Judgment in the Later Zoroastrianism.

These delineations of Avesta are continued on the Bundahesh (say 500-700 A. D.) and in other works of the

later Zoroastrianism, with little or no diminution in the subjectivity of the described occurrences. In the Bundahesh on p. 122, we have: "Then is the assembly of Sadvastar where all mankind will stand at this time."

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In that assembly every one sees his own good deeds and his own evil deeds, and a wicked man becomes conspicuous as a white sheep (sic!) among the black. Afterwards they set the righteous man apart from the wicked, and then the righteous is for Heaven, and they cast the wicked back to Hell; ("take him and cast him away in outer darkness"—darkness being a feature of the Zoroastrian Hell).

As it says on that day, when the righteous man is parted from the wicked, the tears of every one thereupon run down into his legs;—they weep, the righteous for the wicked, and the wicked for himself, etc.

In Daniel we have the fiery stream and the melted metal, and so we have the Lake of Fire in Revelations xx. 10, 14. In the Gāthas (Y. LI) we have "the melted bronze" with no lake or river mentioned, but in the Bundahesh it is a river (p. 125), and it is there, as is usual with such matters in Zoroastrianism, rationally explained; for it results "from the melting of the mountains."

A Recurrence, for Illustration.

In leaving this department of the subject it will not be much amiss if I go back for a moment to the point above (see pp. 37 and 38), and call more fully to notice one most touching "element" in the analogies; see Yt. XXII, 7ff. and Vd. XIX, 30-32. We remember where our blessed Lord, not unlike Vohumanah, upon His throne, addresses His redeemed in judgment, saying: "Come ye blessed of my Father....(Matt. xxv. 35) inherit the kingdom prepared

[&]quot;So I now understand the passage, having formerly thought it could read literally, "as hammered bronze," referring to a sword blade.

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for you from the foundation of the world....for....I was a stranger and ye took me in,"etc.; but the very same good deed is mentioned to the saved soul in the Avesta, and in the matter of essential thought in a manner still superior to that depicted in St. Matthew,—for here in Avesta it is the believer's conscience which addresses him. So in St. Matthew, as we have it further on, the bewildered soul inquires with pleased if startled wonder—"when saw I thee....a stranger....etc." Curiously enough we have again here the very same idea in what has been well called the most exquisite passage of the Avesta and already just above alluded to.

On its way to the Chinvat the soul first meets a fragrant zephyr loaded with aromas of a better land; and it asks: "What is this fragrance which is the most rich which my nostrils have ever grasped?" Here is beyond all doubt the element of gratified curiosity....as in Matt. xxv. But this pleased wonder is again and more incisively expressed in the next scene immediately following, where the image is a holy maid who appears in the bloom of her beauty. The Soul asks as before: "Who art thou, O Maiden, who art the most beautiful whom my eyes have seen?"

And she who is his conscience answers: "I am verily, O youth, thy conscience, thy good thoughts and words and deeds, thy very own;" but, curiously enough, like the person in the Gospel he is again not yet at once convinced, but asks: "Who hath desired Thee hither with his love, [that is, invited thee,] coming with thy majesty, thy goodness, and thy beauty, triumphant and an enemy of grief?" And she answers: "It is thou, thou hast loved me—and desired¹² me hither, O youth, even thy good thoughts and words and deeds. For when thou sawest idol-worship thou didst desist....chanting the Gāthas and sacrificing to the good waters and to Ahura Mazda's fire, contenting [that is to

^{12 &}quot;Invited me."

say, 'showing hospitality to'] the righteous man [i. e., thy brother saint] who came to thee from near and from afar."

I

Here we have hospitality beyond a doubt fully and emphatically expressed in the words "coming from near and from afar";—and so in Matt. xxv, we have as cited above, "For I was a stranger and ye took me in".... In the Gospel, however, it is not in the very forefront, while in Avesta it is the chief moral good deed mentioned; "Coming from near and from afar" might indeed refer to the pilgrims for high-festival occasions doubtless referred to in Yasna XXX, I and XLV, I.

In either case, in both Gospel and Avesta, the soul is pleasingly bewildered, needing explanation as before: "When saw I thee a stranger?" in the Gospel; and in Avesta: "What is this fragrance?" and then, "What maiden art thou?" and then here once again as if expostulating, "Who hath desired thee hither?" or, as I should now render: "Who hath invited thee hither?"

"It is thus," she continues, [through thy good thoughts and words, and deeds, and by contenting the saint who came to thee from afar] "that thou hast made me who am lovely, still more lovely; I am beautiful and beatified; and thou hast made me still more beautiful and beatified; I am seated upon a higher seat, and thou hast made me still more exalted through thy good thoughts, and words, and deeds."—Totally aside from all possible and impossible literary connection, we certainly see in each case the same hesitating doubt with an affecting humility, and the same delighted satisfaction; and most singular of all from one of the same good deeds. It is from this on that the soul goes toward the golden thrones of Vohumanah, Ahura and the rest, as we saw above.

³⁸ So before, "What wind is this?"

ZOROASTRIANISM IN ITS DISTINCTIVE CHARACTERISTICS.

The More Precise Sense in which the Term is Applied Above.

It may seem to some of my readers that this conclusion of my short treatise is hardly the place in which to clinch an important distinction as regards the chief one of all the subjects brought into consideration here. And this final and all-inclusive point or disc, is indeed the entire question of the definite aspect in which we have intended to view Zoroastrianism throughout, and this is especially contrasted with its two sister, or rather with its two closely related, systems, not exclusively so of course, but perhaps fundamentally so—most certainly so, to a very striking manner and degree.

But I have on the contrary the impression that, after having done all that lay within my power to do to awaken interest and to show how the intellectual forces which I proposed to marshal might be thought to tell upon the decision, it might then offer a sort of final incisive effect if I gather up the force of what has been said, and more closely define this one of the principal factors brought into operation. What then, in a distinctive or exclusive definition of it, is this particular Zoroastrianism, the partial effects of which I have endeavored somewhat closely to trace in my few pages above? And of course I mean by the inquiry to define its two sister systems which have been also necessarily brought to some degree into our view; for there exists, as might be expected, the most decided difference between the three, though "these variations do not touch" the primal characteristics of all.

The Avesta and the Veda.

As to the Indian Veda, which is certainly the nearest relative of the Avesta on the southern or south-eastern

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side. I need hardly say that we have here no serious cause to linger further, as I have dwelt upon it elsewhere in fuller terms. The common elements of both Veda and Avesta involved in such a review of them as this, are familiar; and they are also clear and definable; -but they were loosely scattered within the vast labyrinth of early lore which resembles rather an immense and florid forest, where the separated materials of both Avesta and Veda lay at hand, and from which both emerged, its home being far away from all contact with the southern land and up toward the north and north-west of Iran; while of the two the Avesta and Rig Veda, the Veda, let us concede it, far more closely resembles those original growths, (though so much more distant from the common original home) for the simple reason that there is more of it. A lore which is comparatively sparse, from that very fact cannot reproduce so many of the early features of its mother lore, as a sister branch can which is more voluminous. Veda, therefore, as a matter of course, shows more of the common original than Avesta. The Ameshaspends, chief concepts of Avesta, are there in the Veda as I have so fully shown in Zarathushtra and the Greeks, but they were by no means present as a quintessence of selected and especially venerated significant ideas. They are there also totally unconscious of their kinship either with each other or with the selected six of the Avesta; in fact they are ordinary abstract thoughts personified at times indeed, but not distinctly grouped like those in Avesta, nor distinguished and exalted as they are in the Median lore, while one of them, and that one from the Iranian side, one of the most important, is merely the name of a late Vedic seer.

Outside of these few scattered concepts, noble and interesting as they must ever be, the differences as to the tone and substance are marked between the Avesta and the Rik. The highest gods of Veda seem to struggle in a

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throng to attain position above their colleagues; but this desired eminence is hardly the serious and solemn superiority occupied by the Iranian Ahura as he appears in the Avesta; nor does any one of them really arrive at such position as He seeks,—at least none of them reaches it to hold it;—southern imagination was too fervid, restless and creative. Southern life with its milder climates and swarming populations offered too wide an opportunity for both impassioned action, active conjecture, and vehement expression. Each great Deity has to defend his position against his on-coming rivals, one or more.

Zoroastrianism, that is to say, in its earlier form, that of the Gāthas, is, on the contrary, almost our modern system, startling indeed beyond most other things, even when regarded solely as a literary curiosity, with its supreme and refined good Deity and with its excluded Devil—which last idea was indeed one of the best of great suggestions ever made to rid our God of all complicity with crime.

The vile thing, by this doctrine of an "independent Satan," is forever shut out from Him. Nowhere does the Veda show a trace of this; at least not definitely, while the Attributes are almost scattered as if lost amidst an interminable overgrowth;—so much for that relation with the Veda, so vitally essential as in its elements it is.

The Avesta and the Inscriptions.

But what of the Daric Inscriptions and their system, aside from what has been already said or implied above, where, as we see, the relation, so far as it at first presents itself, looks like identity out and out? And here I must pause to make a remark which is almost a stern reproach to science to be obliged to utter. It is that this question has never been put popularly into print and pressed home before, at least not in any effective and incisive way, though

of course it must have been long since often loosely stated in scattered remarks and in many an essay.

As may be seen everywhere above, and in the larger work, the Daric Inscriptions are our great and only positive bridge of literary and historical connection between Israel and the Avesta; for they objectively form almost a constituent part of the Bible on the one side, and of the Avesta on the other; and perhaps of the two they stand closer to the early pre-Exilic Bible, curious as such a statement may at first sight appear to be. Surely no rational teacher of the Holy Scriptures can dwell on these striking Persian edicts in the Exilic Scriptures so vitally crucial as they are to all religious history, without at the same time eagerly scanning and deeply searching the Inscriptions of the very same imperial authorities on Behistan, Persepolis, etc. They possess, indeed, these last, and as of course, in common with the Avesta, that supreme feature, the presence of a God as the Creator of heaven and earth, so termed with a predominant iteration, and therefore they are conspicuously marked above all other documents of their kind ancient or modern. He, Auramazda, is upon those Inscriptions a Supreme Good Being whose memorable name was identical in very form with the Supreme God of the Avesta; and this gives us what most of all we need when we compare the terms of the two lores, the Daric and the Iranian. Taken together with the devotional fervor of Darius expressed, as none such religious aspirations have ever been, in his ever repeated appeals and ascriptions of thankful adoration, these particulars constitute one of the most effective conjunctions of intellectual circumstances of their kind and nature ever recorded or pointed out;-but it is also of course to the last degree necessary to show the limits of these signal advantages in the comparison; -and here we have to lay down a principle which is strictly critical and unsparing. It is this:

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while it is in the first place certainly true beyond all reasonable question that there existed both a knowledge of the Avesta as a series of Medic documents, and also of its general main features on the part of the persons who dictated the texts from which the stone-cutters chiseled the Inscriptions of Behistan, etc., we are, nevertheless. forced to study our sculptured texts in those Inscriptions themselves and in them chiefly, if not in them alone, in order to find out what the creed of their composer was; for unless we positively assume that the now surviving Avesta furnishes the immediate background to the ideas expressed in the Inscriptions, then aside from those Inscriptions themselves, meagre as they must of necessity have been, we possess no such record of the detailed opinions of those authors, Darius and his successors, at all. deed, taking into consideration the necessarily limited extent of the Inscriptions as literary matter, they might be regarded in some aspects of them as being almost the most prominent signal documents of all Monotheism, Creationism and of passionate personal devotion at their date, yet, for all that, they are by no means at all so near the Israelitish creed in the point of their doctrines as the Avesta is; and we cannot leave our subject until we make this clear.

The Dualism.

Strange as it may seem, we cannot even affirm from these majestic memorials alone (i. e., from the Texts of Behistān, etc.), that the priests of Darius actually held even to the more closely defined dualism of the Avesta, though they unquestionably held to the chief female demon who appears in it, and I believe that she or he, for the demon might be male(?) in the Inscriptions, has in the Daric creed, as in Avesta, a *Master*, for such systems are generally *pyramidal*; and that this Master corresponded to the Angra

Mainyu of Avesta seems to be probable in the extreme; and if this was the case, then it was practically certain that he was one of the Two Original spirits; as he is so definitely stated to be in the North Persian writings. He may indeed not have been called by the full title "Angra Mainyu" in the lore of the Inscriptions, but by some modification of it. Or, again, he may have lost in the Achæmenian lore that independence of Auramazda which is of such vital moment in Avesta, just as under the form of Satan he lost it later in the Gospels, where he is completely (?) under the power of the Almighty, and this while he may have retained the name in full or modified.

Each of these possibilities, and any others that can be reasonably presented, must be taken into consideration by us, for such a question as this of the Dualism is, even when regarded as a side-issue, of the utmost interest as well as of the gravest importance as an intellectual religious circumstance; and in our serious endeavors to exploit the entire matter, we should here proceed with the utmost care and circumspection, with regard to it; for we should regard it as a positive certainty that there existed a mass of religious lore in Persia proper which has now been lost to us;—all surviving allusions to Mazda-worship in Greek and Latin authors seeming to refer to the Medic or Zoroastrian form of it.

The Ameshaspends.

Nor can we say with certainty that those composers of the Inscriptions accepted the Ameshaspends; see above, though it is practically certain that they heard their names re-echoed on every side; nor does the word "Deva" occur upon the Inscriptions; so that my readers must understand that, in bringing in the above Mazda-worship, I refer distinctly to the Avesta for my main points as to the detail of

¹See my Zarathushtra, the Achamenids, and Israel, at the places as per index.

the Persian and Exilic eschatology, and not at all immediately to the Inscriptions in my main arguments, for it is in the Avesta, and in that alone, with its implied predecessors, that we have the acme of analogy with the Exilic Judaism. Nothing of its kind approaches it in this respect in the history of any religion with which I am acquainted, unless in cases where the one religion has been distinctly a descendant of the other; that is to say, nothing that is prominent and well assured. Avesta and the Exilic Bible should be to all conscientious searchers the question of the hour. So much for this.

What is Exilic?

But another matter indeed of an analogous character presses closely upon us with the implied demand to make it finally plain in the full scope of all our inferences.

We have been talking at every juncture of what is Exilic, pre-Exilic, and post-Exilic. But what do we really mean by it all? What is then really "Exilic" in a closer definition? The distinction is of course the one most vital of its kind of all that one can possibly make with regard to the Bible; and I have indeed necessarily foreshadowed everywhere what I am now about more distinctly and more fully to repeat, as it will be nearly essential for me to clinch what I have already said above by putting it in the clearest light and emphasis; for, like the other distinctions just made, it is seldom so pointedly presented as it ought to be in its full argumentative force.

Exilic and Pre-Exilic.

The matter in its closer point is this: We everywhere speak of the "Exilic Books"; but it is an obvious and pressing fact that much Exilic matter is present in many places in our at present so-called pre-Exilic texts; we might indeed be imperatively forced to doubt the uninfluenced existence

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of any pre-Exilic texts at all, for how could that primeval lore have been preserved intact; since all knowledge of important parts of it was even entirely lost in such a period as the reign of Josiah.² And in a discussion like this, Exilic matter, if it exists even at all in the Books which we have hitherto called pre-Exilic, becomes, if recognized, equally with the peculiar doctrinal elements of the later books, an almost supremely dominant factor.

What then are the particulars which thus control to a wide extent the situation here?

Perils of the Manuscripts.

It would be like trifling with it for us to ask whether any persons of credit anywhere suppose that the Hebrew Bible has been miraculously preserved, or preserved otherwise than in the usual manner, according to the regular laws of nature. We may therefore take it at once for granted that all serious readers here believe that the texts of the Old Testament and New Testament have been handed down to us in manuscripts-like all other ancient documents of their kind,—and it is indeed a circumstance marvelous enough that they, or any other ancient document at all, have been handed down to us in any form; for the continuous life of ancient books before the art of printing is indeed as strange a phenomenon as the re-appearance of plants or animals in separated continents divided by water from the rest of the world. So, even of our Holy Scriptures, one would suppose that a single breath of war or political agitation would literally shake what is preserved in brittle manuscripts almost to irrecoverable fragments; and undoubtedly every convulsion, such as a campaign or an exilic deportation, has diminished the volume of these precious objects which have however lived on in their mysterious pertinacity. Schools of copyists existed

⁹2 Kings xxii. 8. See the impression produced by the finding of the Book of the Law in the Temple even in that enlightened reign.

everywhere, of course, as well as individual skilled penmen. The scribes were obviously closely occupied in every center of religious learning as an essential element, and some of them in every detached community must have been charged with the especial care of the sacred rolls. And if this were the case while the Temple still stood, how much more must it have been the case in the keen religious revivals of the Exile? Then, as we have already seen, the avalanche of sorrows which first stupified, then infuriated, and at last reformed the holy race, made them search all the more solemnly their religious scriptures.

The to them, doubtless, most impressive pageants of their ritual had exercised unquestionably much restraining influence of a favorable character upon their minds as well as stimulated to some degree the active elements in their faith, and in fact it had been all-important in consolidating and preserving their intense unity as a people; —but temporal and corporeal considerations held their sway, as was most natural, in the incessant struggle and friction of their doubtless busy national and civic life in its periods of prosperity,-with all its fervent passion and its vivid color:—and this may be readily seen in the marvelous literary productions of the Exilic period. But the war of the Exile came, - and their existence as a nation was terminated or suspended. At first their experiences were bitter indeed, with the effect that their beautiful lyrics were the more often heard stirring the calm evening air in the rural suburbs of Babylon and in its surrounding provinces. The songs of Zion become then their consolation,—and since the sacred scenes of the Temple no longer survived to impart support to them, they began all the more eagerly to read and search their to them inspired scriptures;—yes, and to write further such compositions for themselves so that to those bards of the "sad" Captivity we owe most of the sublimer passages of

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all the Semitic Revelation. Then surely they redoubled every effort to preserve and multiply the surviving documents of their Holy Law, written doubtless upon skins, which would bear the wear and tear of constant use better than the later materials, if indeed any other materials were ever really known to them.

Recopying of course took place, as it had never been so pushed on before; and it was done by men who lived near Babylon among the Persian garrisons as well as immediately within the "Cities of the Medes." Do we suppose that those tribes so forcibly settled in these "Cities," which must have been to some degree of it important centers, were of all conceivable Jewish communities the only ones without their Rabbis, their ordinary priests, their scribes and their Exile-archs? Here then was Judaism in the heart of Media which was even more Zoroastrian than Persia proper or than Persian Babylonia. Was not Ragha itself a chief one of those very "Cities of the Medes" to which allusion is twice made categorically in Kings;-Ragha which was a very hot-bed of Zoroastrianism? Surely Ragha, as almost the center of the tale of Tobit, has high claims to have been at least one of those places where the tribes were originally placed. Among the literary people of those tribes was many a one who had at least some admission to the circles of the great satraps, while as to those who had settled near Babylon, the kings themselves lived hard by at the summer palace city, Shushan, amidst the breezy hills of Elam, and both military and royal processions must have often occupied the roads. These imperial people, as we see from Ezra and his successors, knew much of the "Great God" of their new subjects; and that the Jewish leaders knew something of their faith, in reciprocating interest, it would be ridiculous to doubt; information on the one side here of course presupposes information on the other. Avidity is none too strong an expression to

describe the curiosity with which the gifted Semites must have questioned every Persian priest among their other new found fellow citizens, though in the case of the Babylonians the first ferocities of resentment must be allowed time to have worn away.

"What was then, more precisely, this religion of their great deliverer with its God so like their own Yahveh? And what were these angelic beings whose names were echoed everywhere among their new-found friends?"for they were later the very names of the months and days among these North Medic officers, and they may well have been so then; and beside this with little doubt the beings whom they designated were even worshiped constantly at various divisions of the day. If then they could really understand that these noble words meant in their first application more, far more, than the titles of mere angels, that they were actually the descriptive appellations of God's attributes; see above, and only then later personified as His first creatures,-how striking this must have appeared to them. And—what was this deep doctrine "as to thought, as to word, and as to deed"? How melodious too were those Gathic chants in meters sister to the Veda which they now for the first time heard;—and how strange this doctrine of a resurrection,-of an advanced Heaven and Hell,—of millennial hopes, etc. Surely it is impossible that the Jewish schools of Babylon, not to speak again of those in the "Cities of the Medes," should not have known something about the faith of their Persian king, whose troops and courtiers, and beyond all question whose priests also, swarmed on every side with the usual staffs of assisting acolytes. Ignorance here seems simply inconceivable. They must have been little indeed like their successors, the well-known Jewish seers of keenest wit in Babylon, if they knew nothing of all this. Unlike indeed the

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men who founded the impressive schools at that great center, and who wrote our Exilic Bible for us, with our finest Talmud;—little of their kind indeed were they, if they did not find out all that Cyrus's priests could tell them, while the great King was doubtless himself seen often in his first Capitol both in ordinary imperial residence and in the ever-intervening crises of his reign. Remember how closely even an Alexander some centuries later on could question the Persian Destoors as to their lore with its impressive creed—while at later than the latter's date Jewish stories were half pure Persian in Medish scenes; see above.

Every Exile prophet, whose works have survived to us, shows that he breathed a new-found atmosphere; though he may have learned the Persian tenets by hearsay only and at second or indeed only at third hand, just as they must have later heard of the great inscriptions when they were newly cut and of many a predecessor of them now long since vanished, for that their replicas were everywhere is clear from Behistān. Those on that rock could not be at all reached by the passing wayfarers who might wish to read. Copies therefore of their substance, if not of their letter, must have been provided, and they must have been amply in evidence in every higher school.

The contrary to this is excluded absolutely from all sane consideration; see also the alleged messages from Cyrus on his side as also those from Darius, Xerxes, and Artaxerxes; and see their edicts in our Bibles with the throngs of ordinary Persian words and names like Mithradates, among those of the Jews. These things do not prove intercourse; they are "intercourse" itself. And as the prophets, so the priests, and the priestly scribes; the devoted men toiled doubly for many a weary day copying and recopying the holy texts. That they did not restore, interpolate and emend them everywhere is inconceivable,

if for no other reason, then because they were often for the most part quite half the time half-legible; and duty itself would call on them to bring the dim tracings back; whole folios and even masses of folios would be also lost, gone doubtless forever. Emendations were therefore made everywhere at frequent intervals; see above; could this have been avoided? And this took place, as we must clearly see, all the more with regard to the oldest and most sacred parts of Holy Writ. Do we suppose that the skins on which Genesis was painted were really any stronger than those inscribed with the first Isaiah, or that the pigments used as ink were less capable of effecting corrosions in the course of time? Often indeed would the oldest scripture stand recopied in the newest handwriting and upon the freshest scroll. Their new-found ardor, born of their adversities and their new associations, had created the searching diatribes of Ezekiel and of the rest,-and it is inconceivable that the re-writers did not add stirring passages even in the oldest documents to their studies in their endeavor to restore and point the meaning here and there. Little indeed of the Holy Scriptures of those early dates has been left at all to us, comparatively speaking, precious beyond measure as that little is,4 and everywhere throughout the documents which were preserved fresh and live thoughts have been implanted as the needs arose. And from this let us gather our ideas of the "Exilic" elements in the former still embedded in the Semitic books throughout the very oldest documents, though of course these very emendations have themselves shared somewhat the fate of their primeval predecessors. Time and accident, travel, exile, war and sacrilege have of course changed

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^{*}It would be indeed almost a miracle, if truth can assure us that one tenth of our earliest Bible has actually survived, holy and sacrosanct as that fragment so truly is,—emendation, interpolation, excision went on everywhere pars passu with defacement, corrosion, theft, burning, vandalism, and every loss. Exilic matter crops out everywhere throughout.

text after text, and this beyond all question even in the oldest books.

Yet what is original is not so hard to recognize; simply because the Exilic interpolations are so clear. I will not prolong this point;—this conclusion is but intended to be a short remark. Everywhere throughout the oldest books of the pre-Exilic Bibles, the re-writers inserted their keener thoughts: so that "pre-Exilic" is a very dubious term. We must search the very texts of the Hexateuch for it if we would do our work, for Exilic matter must be everywhere.

LAWRENCE HEYWORTH MILLS.

OXFORD, ENGLAND.

CRITICISMS AND DISCUSSIONS.

PHILOLOGISTS' VIEWS ON ARTIFICIAL LANGUAGES.

We have given a good deal of attention to the desire to create an international auxiliary language which is at present in prominence mainly on account of the enthusiastic support which this idea receives from Prof. Louis Couturat of Paris, who has a powerful ally in the famous Prof. Wm. Ostwald, a leading propagandist for the introduction of Esperanto in Germany. The aspiration of the Esperantists is a good sign of the growth of international goodwill and indicates an anxiety to break down national barriers, to overcome prejudice, and to establish a good *entente* in this Babel of diversified speech.

With all the interest we cherish for the promotion of cosmopolitan ideals, we do not believe that the aim can be reached by the short cut of an artificial language. We trust to nature and hope that nature herself will in the long run work out an international language, not by a formal agreement nor after the fashion of acts of international legislature, but by natural growth. When the time will be ripe the fruit will be developed, and we see the time coming when one speech will be understood all over the world. Esperantists are more enthusiastic and cannot bide patiently that far-away time. They think that by artificial methods they can improve upon nature's tedious processes.

Some time ago there was a general wave of enthusiasm for the introduction of Volapük, but the claim of its adherents that Volapük could be learned very easily and would be spoken universally in time, soon broke down under the fact that the new language was too German to be pronounceable by the French and English, much less by the Slavs and non-European nations. Reforms were attempted but finally the whole scheme was abandoned. At present Esperanto is in vogue. It comes with the same pretensions and we

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are fully convinced will meet the same doom. We have criticized Professor Ostwald's objections to English as a world-speech and have devoted to the discussion of Esperanto several articles in *The Monist** including also for the benefit of our readers a short synopsis of the language itself,—its grammar, vocabulary and pronunciation. We have found that it is by no means as easy as it claims to be and that it would be far easier and much more useful to learn English than Esperanto.

We must consider that the use of words, phrases, etc., of all languages is determined by custom. If a language is sketched out ideally, so that, for instance, certain roots shall have definite modifications, and certain endings shall indicate definite grammatical relations, the number of word formations would be so great that we would be embarrassed by the wealth of the several modes of expres-

sion.

From among the many different possibilities, custom chooses one and stereotypes it to suit exact conditions. This process can not be done by grammarians in the study but must be accomplished in actual life by an exchange of thought guided by definite needs.

Habit has more to do with the formation and especially with the fixation of speech than the advocates of an artificial international language imagine. The writer has had sufficient opportunity to observe the truth of this when meeting with foreigners who spoke English with great fluency but had learned it in a theoretical way in their own country far away from English-speaking people. There are many expressions which logically should be perfectly correct to use, but habit settles on one special meaning and if the word is used otherwise it is apt to be misunderstood. One foreign child, for instance, said to her comrades at play, "If you succeed in doing this, you gain; if I do, I gain." She meant to say, "I win in the game," translating the French word gagner by the word "gain." I heard Germans speak of a "sandbench" when they meant a "sandbar" in the lake.

Since there are so many special cases in which thoughts or grammatical relations are specially needed, all languages which originally followed certain types of logical regularity form what stenographers call "word-signs," and so the irregularities of our grammar are by no means a fault of our languages but a very use-

^{*&}quot;An International Auxiliary Language," by Louis Couturat (with editorial reply), XV, 143; "Dr. Ostwald's Pamphlet on Universal Language," XIV, 591; "Esperanto," XVI, 450.

ful contrivance of nature. I wish to call attention further only to the fact, that it is not the far-fetched or rarely used words and forms which are irregular but the most commonly employed terms of our daily conversation, such as "to be," "to do," the pronouns, etc. This is true of all languages and indicates that irregularities have not been invented to bother schoolboys but to facilitate every-day speech, which after all is the sole purpose of language.

For these and similar reasons we deem it inadvisable to create an artificial language. We do not deny the possibility of its invention but we claim that such an artificial language as Esperanto or Volapük would have to adapt itself to the requirements of mankind and this might take centuries. If that is the case it appears naturally much easier to develop an existing language into a worldspeech than to create a new one, and thereby to have mankind, in addition to the groping of the linguistic instinct, pass through all the intellectual measles of theorists. Incidentally we will repeat that while we deem the invention of an artificial international language a Utopian project, we trust that it would not be impossible to invent an international writing,—a pasigraphy which would be a universally recognized sign language which men of different nationalities might read, each in his own tongue. (See "Pasigraphy-A Suggestion," Monist XIV, 565.)

We are glad our criticism agrees with the opinions of philologists who must be regarded as experts in this matter. We are in receipt of a letter from Dr. Karl Brugmann, professor of Indo-Germanic languages at Leipsic, together with a pamphlet by himself and his colleague, August Leskien, professor of Slavic tongues in the same institution. It is entitled Zur Kritik der künstlichen Weltsprache, and contains a review of the latest aims in the direction of an artificial universal language with special reference to Esperanto. Professor Brugmann speaks of the difficulties that contend in general against such a project. He calls attention to the former labors of philologists (which however remained unheeded by the Volapükists), especially Ernst Beermann in his "Studien zu Schleyer's Weltsprache Volapük," (Program of the Gymnasium at Ratibor, 1890) and Gustav Meyer in his "Weltsprache und Weltsprachen" in the Schlesische Zeitung, 1891, No. 400 and 406, (republished in his Essays und Studien zur Sprachgeschichte und Volkskunde, Bd. 2, Strassburg, 1893, pp. 23-46).

Even in those days honest Volapükists acknowledged that "an average man needed hardly less time to acquire a mastery of Volapük

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than of most natural languages" (p. 10). Volapük died a natural death. It was not suppressed by its enemies nor can it complain of any unfair treatment from outsiders. When the propaganda was at its height the difficulties began and it was felt that reform was necessary to render the language useful for practical purposes. Professor Brugmann says (p. 10): "The movement split into two camps. An international world-speech academy consisting of seventeen members belonging to twelve different countries sought to preserve uniformity and union." The inventor of Volapük, Rev. Schleyer, was expected to join them, "but he reserved to himself the right of vetoing their statutes in all questions of universal language. A union could not be attained and so the whole Volapük movement fizzled out."

Esperanto was invented by a Warsaw physician, Zamenhof, and is mainly built up of elements of the Romance languages with a sprinkling of German and Slavic. The program of Esperantists is to introduce it into schools and use it to meet the "needs of daily life, the purposes of trade and commerce, and also the demands of science." Professor Brugmann refers to the fact that only very few philologists have become partisans of an artificial language, but among them the famous Prof. Max Müller of Oxford has repeatedly expressed his sympathy with their aspirations without reserve, and has declared one after another of the world-languages to be the best possible attempt, which caused Gustav Meyer to remark "that it would be wise for every one who has reason to think that his comments will be printed or used for advertisements to keep a list of them himself. If Prof. Max Müller had done so he would not have forgotten when he wrote to Mr. Liptay [author of a Gemeinsprache in 1891] that he had given his blessing a short time before to Schleyer's Volapük."

Other philologists who are found in the ranks of Esperantists are Professors Schuchardt of Gratz, Baudouin de Courtenay of St. Petersburg, and Jesperson of Copenhagen, but how Platonic their interest must be appears from the fact that they simply sanction the idea without attempting an invention of their own, in spite of being themselves trained philologists. Professor Brugmann discusses the chance an artificial language stands of being a help in practical life, a medium of trade and commerce, and an assistance to science, and comes to the conclusion that in each case it would simply add more complications to existing conditions. "The real difficulties" says Brugmann (p. 22), "would begin only when the

adherent of a world language would think he had attained his purpose." That is to say, that at the moment when Esperanto was actually introduced as an obligatory study in our schools and used for international purposes, the differences and divergencies of opinion as to how best to meet them, would lead to so much trouble that the whole structure would collapse. The partisans of Esperanto are so carried away by their enthusiasm that they are intoxicated as it were by visions of success, where in reality an evident failure is but toned down by a little courtesy. It may be of interest to our readers to read what Professor Brugmann has written on the subject in his letter. He says:

"Perhaps you would like to take advantage of the opportunity to correct a great error which Ostwald has started in the world and which might work new mischief in the heads of the uninformed. Ostwald writes as follows in an article "Esperanto" in Daheim for 1907, No. 42, p. 21: 'Further, over 1200 university professors and members of scientific societies declared themselves in favor of the aims of the delegation, and although in Vienna the Association of Academies refused their active sympathy to our efforts, this was decided by such a close vote that it was nearly even. Here, therefore, was convened an intellectual army of no inconsiderable power.' The truth is that of the twenty-one associated academies only two or three had instructed their representatives to vote in Vienna that the Association should accept the proposed office of arbitrator. So the case is accurately presented by H. Diels, the secretary of the Berlin Academy, in the Deutsche Literaturzeitung for July 6, No. 27, 1896. 'At the conference proper, then, the final vote was taken on the 20th of May. The result is that the majority of the Academies refused any expression on the question at all, whereupon it may be noted that only a few of the minority, as was shown by the written expressions of these academies which were sent in before, really favored the plans of the delegation, while the greater number even within the minority desired a discussion only out of courtesy, but were themselves opposed to the project of a universal auxiliary language."

The second article in the same pamphlet is devoted to a criticism of the construction of Esperanto itself, and here Professor Leskien calls attention to the fact that Esperanto does not avoid the mistake of Volapük which contains a number of letters difficult to pronounce for the English and French, but it adds new complications in letters which are difficult for Germans to pronounce. Dr.

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Zamenhof shows a special preference for complicated sounds such as tsh, dzh, etc., which necessitate the introduction of letters marked with special diacritical signs. He further overloads his language with diphthongs, each one having a pronunciation of its own. The plural ending j as in bonaj viroj will prove especially hard on the French and is certainly not easy to other people. While in English, k is dropped before n so that "knave" is pronounced as "nave," Zamenhof introduces the kn without hesitation. It would lead us too far to enter into all the details of the difficulties of pronunciation. We will only mention that differences of sense are introduced in unaccented syllables so as to obliterate the differences of sound: mi amas means "I love"; mi amos, "I shall love"; and mi amus, "I might love." How shall the ear catch these fine distinctions? Esperanto demands that every letter be carefully pronounced and Professor Leskien comments on it that "whatever Englishman, Frenchman, German or Scandinavian succeeds in distinguishing plainly such Esperanto words as kiuj, 'which'; tiuj, 'those'; and tshiuj, 'all,' deserves our full admiration." (P. 33.)

Esperanto also contains its amusing features which originate to a great extent in the rule that there must be no exceptions. As instances Professor Leskien calls attention to the fact that patro means "father," and patrino (literally translated "fatheress") means "mother." Junulo means "youth," and since the prefix mal denotes a contrast, maljunulo means "old man." Predzhi means "to pray," and since the place of action is formed by the ending ejo, predzhejo means "the place of prayer" or "church." Professor Leskien comments on the implication of thus forming a language: "If we now translate into Esperanto, 'The Pope is the head of the Catholic Church,' we see at once the folly of such formations, for ecclesia or 'the Church' means something quite different from the place of praying."

Professor Brugmann quotes Gustav Meyer's comparison of Volapük to a homunculus, that artificial manikin in the second part of Goethe's Faust, which is made by Professor Wagner. Brugmann says that the simile remains only a simile, but we would say that the comparison is more than a mere analogy. Languages are living organisms as much as animals, and it is not more or less possible to create spiritual than it is to create physical organisms.

In connection with the ideal of a universal world language it would be appropriate to add a few comments on the labors of the

Simplified Spelling Board whose circular No. I of March 21, 1906, with addendum, April 30, 1907, opens with the following passage:

"All whose mother-tongue is English believe that, if it is not unfairly handicapped, it will become the dominant and international language of the world. For this destiny it is fitted by its use as the medium of the widest commerce and the most progressive civilization, by its cosmopolitan vocabulary, and by its grammatical simplicity. No other existing speech, and none of the proposed artificial international languages, has the same adaptability to such a use. There is, however, a wide-spread and well-grounded conviction, that in its progress toward this goal our language is handicapped by one thing and one only—its intricate and disordered spelling, which makes it a puzzle to the stranger within our gates and a mystery to the stranger beyond the seas. English is easy, adaptable, and capable of a many-sided development: its spelling is difficult and cumbersome."

A protest must be entered here first of all against the first phrase, that "all whose mother-tongue is English" believe in its future. We are acquainted with many people of English birth who have not the same strong conviction, and what is more important, if they all believed as the Simplified Spelling Board would have them it would count for nothing, for even the Chinese believe that their language is the fit international medium of communication. It is too natural for everybody to think his own the easiest language of all. English is not the native tongue of the writer. On the contrary he acquired the language at a comparatively late period in his life, and yet he is fully convinced of the fact claimed by the Simplified Spelling Board that "it will become the dominant and international language of the world." It will attain this distinction by the simplicity of its grammatical and syntactical construction, and we believe that any simplified spelling will not only fail to be a help in the attainment of this aim, but will be a hindrance. This is one, and perhaps the main, reason why we have so far refrained from taking part in this reform movement of simplified spelling. The simplified spelling is without system except perhaps the tendency toward phonetic spelling, and we must here enter a second protest against the statement of the board that the traditional English spelling is a puzzle to the stranger within our gates. The writer at any rate knows from his own experience that his only difficulty with the English was its pronunciation while the spelling was one of the greatest helps to enter into the very spirit of the language. In fact it almost

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seems as if the spelling were made for foreigners and if English were spelled phonetically it would add immense difficulty to such students. Only contemplate the word sikik. Who would at once connect with it the same idea as when he sees the word "psychic"? The foreigner would be as much if not more puzzled here than the native student, for when he becomes acquainted with the word he learns it through its derivation from the Greek. There is so little difficulty to the foreigner in the English spelling that in all the great spelling bees of the New York schools it is those foreigners who can scarcely speak English correctly who commonly carry away the honors.

While we do not deny that the spelling of English can be improved we believe that we are little helped by spelling "crusht" instead of "crushed" for the latter form is much more helpful by indicating at a glance that the word is a verbal form. "Past" as an adjective may very well be distinguished from "passed" the participle. Although it would be useful to spell "thru" in the simplified way without the cumbersome gh, yet the latter reminds us of its derivation from a Saxon word corresponding to the German durch; an analogous case is "though" which corresponds to the German doch.

To spell "quartet" instead of "quartette" is not advisable so long as we retain the French accent on the second syllable. But whatever objections we may have in detail, we think there is not much harm done if here and there a new spelling is introduced. We have so many words in English which are wrongly spelled historically (note e. g., the spelling of "could") that it would be instructive for the pedants of English orthography to learn to distinguish between right spelling that is simply due to custom, and correctness which is based upon linguistic facts and sound reasoning. Moreover we must not forget that spelling is no problem that involves grave consequences, and the salvation of our souls does not depend upon it. If the majority of people make up their minds to spell a word in a certain way we for our part are willing to submit, and if the spelling is not sensible we can yield to the popular demand without great compunctions of conscience. Even our great martyr president used to say in extenuation of poor spelling that that man must be a fool who could not spell a word in several ways.

The report of the Simplified Spelling Board continues:

"Apart from its relation to the foreigner, our intricate and disordered spelling also places a direct burden upon every native user of English. It wastes a large part of the time and effort given to the instruction of our children, keeping them, for example, from one to two years behind the school-children of Germany, and condemning many of them to alleged 'illiteracy' all their days."

This claim is based upon a statement made by Prof. Max Müller which may or may not be true, for its verification is very difficult; but one thing seems certain, that if it be correct, we ought first of all to reform our methods of teaching English spelling before we start at the spelling itself. From what we know by personal experience and by inspection of the spelling primers, the methods of teaching orthography appear to be devised for the purpose of stultifying the children and making the study as hard for them as possible.

It does not seem reasonable to us that a "gradual simplification of the spelling will aid the spread of English." The only way in which English can take root among those nations which speak other languages would be by accustoming their children at a tender age to the sounds of English speech.

We are firmly convinced that the time will come when one language will carry us throughout all the countries of the world, and this will be brought about in the natural development of mankind even in spite of the wrong methods employed by the advocates of an artificial auxiliary language and a Simplified Spelling Board.

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REPORT OF THE DELEGATION FOR THE ADOPTION OF AN INTERNATIONAL LANGUAGE.

Carried to their ultimate conclusion, the efforts after international peace might be considered to lead ideally to one universal nation or brotherhood of nations, a universal religion and a universal language. It is surely as a step along this path of progress that many intelligent men and learned societies are advocating the adoption of an international auxiliary language which is intended to facilitate commercial and other relations between the countries of the earth. The official society of the advocates of such an international language is called the "Delegation for the Adoption of an International Auxiliary Language" (Délégation pour l'adoption d'une langue auxiliaire internationale), and it is a noteworthy fact that by July 15, 1907, its membership consisted of 301 societies and

1251 names of individuals belonging to university faculties and learned societies (including many of the Academies of the International Association). The societies include commercial, literary, scientific societies, even trade guilds such as the Belgian Society of Engineers and Industrial Workers, geographical societies, humanitarian associations and international camps of every variety.

The Delegation publishes a summary of the twelve hundred individual names arranged by cities. Of course Paris has much the largest number, as eighteen institutions of that city are represented, and very fully. We find names also from the universities of Michigan, Ohio, Missouri, Southern California, Nebraska, Pennsylvania, Washington, Yale, Harvard, Princeton, Columbia, Cornell, Johns Hopkins; Bryn Mawr and Williams Colleges; American Academy of Arts and Sciences at Boston, Virginia Polytechnic Institute, and the Academy of Science at Washington, D.C. Of some of the Western ones of these American institutions more than twenty names are enrolled, and even Princeton has eleven repre-Further particulars may be obtained by application sentatives. to the secretaries of the Committee of the Delegation, M. Louis Couturat (Treasurer), 7 Rue Pierre Nicole, Paris (Ve); and M. L. Leau, 6 Rue Vavin, Paris (VIe). These gentlemen have issued a report on the proceedings of the Delegation with relation to the Academies which pertains to the subject under discussion by Professor Brugmann, as quoted by Dr. Carus on another page of this issue ("Philologists' Views on Artificial Languages"). The Report quotes the letter of the Academy of Vienna written in response to a request of the Delegation, endorsed by eight prominent men including Couturat and Ostwald, that the Imperial Academy of Vienna as the presiding Academy should include the question of the choice of an international auxiliary language in the program of the approaching general assembly. The letter is addressed to the other academies of the Association asking them to vote for or against the insertion of this point in the program of the meeting, but adds certain suggestions for their consideration which, translated, read as follows:

"Since according to Section 3 of the By-laws only such objects as are proposed by one of the associated academies may be taken into deliberation, we had first to ask the members of our Academy whether they would consider it desirable to make such a motion. The result of our deliberations was that it hardly seemed advisable to pass over in silence a petition supported by such learned names

and also, as we well know, by a much greater number of important people. On the other hand, the difficulties of the affair itself cannot be ignored nor the strictly circumscribed limits which have been set in Section 3 of its By-laws to the operations of the Association." From this standpoint the Imperial Academy of Vienna proposes to its correspondents (1) that the International Association will place the petition of the Delegation on the program at the approaching general assembly; (2) that the Association should decide that it does not consider itself competent to undertake the choice of an international auxiliary language without entering into the question too deeply.

Such was the final official action of the Academies, and the Delegation as represented in its Report does not consider this result as in any way derogatory to the cause; for, they say, it is clear that the Academies have not entered deeply into the question and have decided nothing except that it did not come within their province. Moreover the Academy of Vienna did say that "a solution will be found by the empirical paths hitherto trod; i. e., by intelligent attempts, and careful adaptation to the actual needs. more readily than by theoretical investigation," thus implying (in the opinion of the Delegation) the possibility of a practical solu-Since it is necessary to find a solution adapted to definite needs, this is the task that has been undertaken by the Delegation, and the action of the Academies gives them assurance that the Delegation through its committee will solve the problem more quickly and satisfactory than the Academies could, and that the decision of the committee will bear more weight in the eyes of the people than a commission chosen by the Associated Academies. Accordingly a committee of twelve men was chosen for the task with MM. Couturat and Leau (above mentioned) as its secretaries.

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SAMPSON AND SHEMESH ONCE MORE.

An article¹ in *The Monist* of January, 1907, in which I denied the identity of Sampson the Hebrew Shophet with Shemesh the Chaldean god, has given rise to a book entitled *The Story of Samson*, recently published by the eminent editor Dr. Paul Carus. In it

¹ This has been published in the Appendix of *The Story of Samson*, p. 173. (Open Court Publishing Co., 1907.)

he treats the story of Sampson as a myth deriving its origin from the worship of the god. No one can read without interest the learned compilation which the book contains, of facts connected with the early religious history of mankind; but to me these facts do not seem to sustain its conclusions.

The arguments in favor of Dr. Carus's theory are really two: the name of the man, and the vicinity of Beth Shemesh, (regarded as a temple of Shemesh) to the scene of Sampson's career.

Ist. The name Sampson (Shimshon) is interpreted to mean a solar person. On this point Dr. Carus has the authority of modern philologists. I have that of Josephus in maintaining that the name denotes, not a solar man, but a strong man. Josephus testifies as to a fact concerning which he cannot have been in error. As to the manner in which the mistake of the lexicographers may have arisen, I have nothing to add to my remarks in a former article.

2d. There was a small town in the territory of the tribe of Judah and near Sampson's residence, called Beth Shemesh. After the Iewish conquest, the Canaanites continued to occupy it jointly with the invaders. It is assumed that it was the site of a sanctuary of the god Shemesh. The word Beth in connection with the name of a deity sometimes designated a temple of that deity. Of this we have an example in the term Beth Dagon for the temple of Dagon at Ashdod. The terms Beth Shemesh and Ir Shemesh, house and city of the sun, have suggested the idea that the old village was a scene of Shemesh worship; but the conjecture rests on no solid foundation. There is no evidence in the Bible, or elsewhere so far as I am aware, that the god was worshiped in Palestine, nor does the word Shemesh occur there save in the ordinary sense of the sun, unless as an element in the name of that place. As such an element it admits of the ordinary explanation. The name Beth Shemesh, or sun house, probably meant simply a place for drying fruit. We know that the people of southern Palestine made great use of dried grapes. A dry house, or as it is termed in California. a curing house, where their delicious fruit was collected and made into raisins, might well become the nucleus of a town, just as a little station in Dakota where wheat is bought, grows into a village. That such may have been the case with Beth Shemesh becomes more probable when we consider that there were three cities of that name, -the one above mentioned in the territory of Judah, one in that of Naphtali, and one in that of Issachar. How many dry houses there may have been around which no towns grew up, does not appear.

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A confirmatory instance is found in the name Beth Dagon. In one instance it denotes the temple of that god at Ashdod. There may be another instance of such a temple at Gaza, but it is doubtful, If Dagon² and Dagan³ are merely variations of one word, Beth Dagon meant originally a corn house, a granary. Ashdod may have grown up around a granary. The names Ashdod (stronghold) and Beth Dagon give a glimpse of its growth. A granary, a town, a stronghold with its temple, standing perhaps on the site of the original granary. There was another Beth Dagon in the territory of Judah and one in that of Asher. Is it probable that all these were temples? The word Beth as an element in the name of a town often occurs when the other element excludes the idea of a temple, as Beth Phage (green fig house), Beth Hacherem (vineyard house). There are other towns where the word Beth has been imagined to denote a temple, as Bethlehem (bread house), conjectured to have been a temple of Iachmi, a god not known to have been worshiped in Palestine, and Beth anath (audience house or Hörsaal) supposed to have been a temple of Anat, a goddess equally unauthenticated in Palestine. Bethel (house of God) was a name given by the Jews to the old Canaanite town of Luz (almond tree) after the ark had been located there.

Attentive examination of the names of localities in southern Palestine reveals much concerning the pursuits of the people, but little relative to their religion. The names of numerous towns denote that agriculture was the main subject of thought. The following are names of towns mostly in the territory of Judah and Dan: Hazequah, New tilled land; Shilehon, Sprouts; Eshtaol, Setting; Beth Tappuach, Citron house; Carmel, Orchard; Zorek, A kind of fine wine; Rimmon, Pomegranate; Hanab, A place of grapes; Gath, A vat; Gittayim, A double vat; Hagderah, The hurdle; Gderesthayim, Two hurdles; Beth Phage, Fig house; Marmanah, Dung heap; Sansannah, Palm branch; Luz, Almond tree; Ain Gannim, Garden spring; Hak-kerem, The Vineyard.

The people who gave these names were thinking of the cultivation of the grape, the fig, the almond, citron and pomegranate; productions collected at various places, and sent as wine or raisins or other cured fruit to the port of Ascalon to be shipped to the great markets of Egypt and Phœnicia.

Concerning the religion of Palestine before the Jewish invasion

our knowledge is imperfect. It appears that there was a sanctuary at Jerusalem (the city of peace) where disputes were adjusted by a ruler whose name or title denotes a judicial office. Abraham finds Melchizedek there (the just king), and Joshua, Adonaizedek (the just lord). Nearly a hundred and fifty years before the time of Moses, and in the reign of King Amenophis IV, the ruler at Jerusalem was Abdi Dhaba, whose correspondence with that Egyptian king was found at Tel el Amarna. In one letter he speaks of the temple at Jerusalem as a temple of the great god Uras. Winkler identifies this deity as the Assyrian god Ninip, and the identification throws light on the whole religious history of Palestine. Herodotus, who was very careful and conservative in his identification of foreign and Hellenic gods, upon his arrival at Tyre, at once recognized Hercules in the Baal of the great temple which had stood there for ages. He gave him no other name than Hercules. Josephus also identifies the Tyrian Baal with Hercules. The term Baal (lord) and the other term by which the Tyrian deity was known, Melcart (city king) are so general as to give no definite information; nor is the name Moloch (king) more specific. Berasus, however, gives an item which affords the necessary identification. He says that Hercules was Sandes (Σάνδης) Oppert has identified Sandes with Ninip. Ninip was, like Shemesh, one of the great gods of the Chaldean Pantheon, but of different character. He was the resistless champion rather than the august judge. While the main temple of Shemesh was at Seppara, and he was called Shemesh of Seppara, that of Ninip was at Calah, and he was called Ninip of Calah. The latter place was identified by Rassam as Nimrud.

When Layard excavated at Nimrud the temple built by Shalmeneser I and Tiglath Pileser, he at once identified Ninip as Hercules, just as Herodotus had done at Tyre twenty-three centuries before. We can from these identifications comprehend how this worship of the Tyrian Baal, the Jerusalem Uras, the Ninevite Ninip, tended constantly to become the prevalent religion of Palestine. It was a national religion of the Canaanites, who were largely intermingled with the Jews. It was not merely the religion of a conquered people, all the dearer because regarded with aversion by their conquerors, but also that of adjacent nations more powerful than the Jewish kingdoms.⁴ The wealth and civilization of Tyre, the supremacy of Nineveh, the magnificence of the temples of these

⁴The two Ishtars (of Nineveh and Arbela) under the plural form of Ashteroth were worshiped also at Tyre and Carthage.

great cities overwhelmed the popular mind. The rank of the ancient gods was largely determined by the power of their respective cities. The superiority of Tyre and Nineveh seemed to falsify all that Hebrew priests or prophets could say of the omnipotence of Jehoveh. It was mainly at Jerusalem that the worship of Jehoveh was maintained, and the removal of the principal part of the population of that city, who preserved their religion zealously in captivity, kept in observance a religion which had lost ground in the greater part of Palestine.

All this goes to show that an inhabitant of Palestine, devising a myth of a Jewish hero invested with the character of a heathen god, would have selected the Assyrian and Phœnician Ninip as a prototype, rather than Shemesh, a remote and unfamiliar Chaldean deity; and if he had given his subject a divine name, would have used that of Baal. The Carthaginians made use of that name in forming proper names, as Hannibal, Hasdrubal, etc.

There are several features of the Sampson legend which to me seem to import historical verity.

First. The story of the jaw-bone of an ass. The utter absurdity of the story literally taken suggests some similar absurdities easy of explanation. Kohlrausch, in his history of Germany, says that a large number of the Swiss who fought at Morgarten were armed with morning stars. The absurdity disappears when we learn that a Morgenstern was a mace with spikes like the rays of of a star. The Duke of Wellington expressed himself as satisfied with Brown Bess as a weapon for the English infantry. Brown Bess was a familiar term for a regulation musket. If we observe the representations on the monuments of a heavy Egyptian battle axe, with its blade shaped like the jaw of an ass, and the projecting knobs which imparted weight to its impact, we shall at once see how it might have got the name of an ass's jawbone. It was a ponderous two-handed weapon, only used by the strongest men of the Egyptian army.

The occasion when the weapon was wielded seems to have been one of a stratagem. The Philistines demand that Sampson be bound and delivered to them. He is brought, apparently bound, but at the right moment the bonds are thrown off and weapons provided. Sampson seizes the pole axe and with his fellow countrymen, attacks the enemy. He and his friends acted valiently no doubt, but the thousand he slew were like the tens of thousands slain by David in

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the triumphal songs of his countrywomen. The rout of the Philistines was the real fact.

Second. The exploit of Sampson in carrying off the gates of Gaza. I do not understand with Dr. Carus and the translators of our received version, that he carried them to the top of a hill that is before Hebron, a distance of many miles. The original is:

ויעלם אל ראש ההר אשר על־פני חכרון

I think the preposition has here the meaning of *versus*, towards, and that it means out on the Hebron road, perhaps a very short distance from the city.

Third. Dr. Carus has expressed the idea, in which I fully concur, that the circumstances attending the death of Sampson are represented as occurring at a kind of Saturnalia. The name Saturnus was derived from satu, a supine of sero, and denotes a sower. And in like manner Dagon probably comes from DaGaH,5 "cover," and denotes the covering of the seed. The saturnalia was a harvest festival in which the people of Rome gave themselves up to hilarious rejoicings. The Jews likewise had their harvest feast of tabernacles. The Philistines, an agricultural people, must have had some festival of the kind. Sampson was brought to a festival. It was a national affair. "All the lords of the Philistines" were there. The translation is here indefinite, but the original is very definite. "Serens," or lords of the Philistines, a title not elsewhere applied, were five in number, the chiefs or kings of the five cities. They met at the great temple of Dagon. We know of no other temple of Dagon than that of Ashdod, where the ark was kept during a portion of its captivity, and that city was the most central of the Pentapolis. It was there probably that the great concourse assembled to thank the venerable god for the bounties of the year, and indulge in the extravagances of popular joy. The Hebrew captive was brought out and treated with sportive deference before being sacrificed. Dagon, like Saturn and Moloch, was pleased by a human sacrifice, and the people were full willing to sacrifice a captive who had done them so much harm. So the multitude gathered in and about and even upon the huge temple. Beneath the multitude on the roof, the whole building suddenly collapsed with frightful loss of life, and among the rumors that arose was one that Sampson had pulled out the supporting columns. Whether true or not, the report

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⁶The Tel el Amarna correspondence shows a temple at Gaza which appears to have been one of Ninip—not Dagon.

was favorably received by his countrymen, who rejoiced in so signal a vengeance, and was incorporated in the legend of his life.

I still believe that the Sampson legend is a genuine tradition of fact, though not unmingled with the alloy of exaggeration and rumor with which all tradition is combined. Sampson was an actual Jewish Shophet, and not an imaginary Chaldean god.

GEO. W. SHAW.

DR. PFLEIDERER ON THE SAMSON STORY.

(A Translation.)

To the Editor of The Monist:

I have read with great interest your essay on the Samson myth in the January number of The Monist, and agree with you on all essential points, especially when you find in Samson and analogous heroes in whom an incarnated god fights, strives and conquers, a typical ideal which has received its most excellent fulfilment in the Christian faith. The question whether any particular myth has its origin here and there in historical legends, or whether the legends have grown out of the myth without any historical foundation, you leave undecided. I too think that it is not to be answered a priori and universally but only in each concrete case under exact investigation of the tradition. But for the Samson myth I would consider a historical foundation as improbable as for that of Heracles and Izdubar. The localization of mythical features may be followed up in every case and is closely connected with the different places of worship at which the myth becomes realized in the ritual drama. Your observation is excellent that the Easter ritual of the Greek Church is formed after the dramatic representation of the Attis and Tammuz festival (page 74). But why is this said to have taken place only since the time of Constantine? Should not rather our Gospel Easter story have found its most simple explanation in the imitation of the Syrian Easter festival? I have pointed this out in my last two books (Entstehung des Christentums and Religion und Religionen) and in my opinion it deserves serious consideration. Then also the parallel of the Evangelical Passion story with the Spottkönig of the Saceans and Saturnalians must not be overlooked. If one will but consider that from the beginning the death and resurrection of the God-man has been the main content of the Christian faith which alone was recognized by Paul and which Mark

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considered of first importance, then the question of the historicity of this content becomes clear and constantly more important. I would like very much to learn your opinion about the hypotheses of Benjamin W. Smith (Der vorchristliche Jesus) and Thomas Whittaker (Origins of Christianity). It would be serviceable if you would bring these radical theories into contrast with my comparatively conservative view, and would instruct your public about this crisis at the very beginning of primitive Christianity.

DR. OTTO PFLEIDERER.

GROSSLICHTERFELDE, GERMANY.

THE LOGICAL ASPECT OF THE THEORY OF HYPER-SPACES.

A study of the articles on hyper-spaces by Cassius J. Keyser in *The Monist* for January 1906 and by W. B. Pitkin in the January number this year seems to me to reveal pretty clearly an error into which certain mathematicians have fallen in the consideration of this subject. But the curious thing in Mr. Pitkin's article is, that, although he is sufficiently aware of the error to perceive it in others, he partly falls into it himself in pointing it out in them. In short, he only partly perceives the error.

The error is in trying to generalize the idea of dimensionality. The truth is that dimensionality is a property peculiar to space. Dimensions determine space and other properties determine other things. But, as Mr. Pitkin says, while the dimensions of space are determinants, the determinants of things other than space cannot be called dimensions.

But the proof of this fact depends, I think, on differences more thorough and radical than Mr. Pitkin is aware of.

The striking peculiarity of the dimensions of space which distinguishes them from the determinants of sound or color or anything else, is the fact that they are all identically the same in kind. For convenience in conversation we refer to them as length, breadth, and height. But, as regards the determination of a given space, it is of absolutely no importance which dimension we term length, which breadth, and which height. A striking result of this peculiarity is that any two or all three of these dimensions may be multiplied together and an intelligible result produced thereby. The fact is that the dimensions of space are themselves space-forms of space.

The three dimensions of a space are all lines. We use one-dimensional space to express the dimensions of three-dimensional space. Besides this, it is not altogether accurate to describe space, as we know it, as three-dimensional. It is not the whole truth. For we are just as familiar with two-dimensional and one-dimensional space as we are with three-dimensional—to say nothing of the point which is of no dimensions. Three is simply the greatest number of dimensions that most men are capable of perceiving. And it is just this actual existence of space of less than three dimensions which opens up the possibility of the existence of space of more than three dimensions.

Now what is the case as regards the determinants of a musical note—pitch, timbre, and loudness? Are these all identically the same in kind? Could we just as well call pitch loudness, or timbre pitch? Moreover is there any such thing as a one-dimensional tone—say of loudness only, or pitch only? or a two-dimensional tone of pitch and timbre without loudness? or can we multiply pitch and timbre together and produce a result which has any meaning? or can we obtain anything intelligible by multiplying pitch, timbre and loudness together? All this is sheer nonsense! As well talk of multiplying coal-tar by sawdust and thus producing music.

These considerations completely knock the bottom out of the argument by which, from the analogy of tones, Mr. Pitkin seeks to establish the impossibility of a four-dimensional space. Nothing at all analogous is to be found in the science of sound or color or anything else. The three known dimensions of space being all exactly the same kind, the existence of a fourth dimension of the same kind is easily conceivable. But in the case of a musical note, if we think of a fourth determinant, the question at once arises, of what kind is it to be? In the case of a fourth dimension of space, no such question arises. A tone having three determinants of three different kinds, plus a fourth of the same kind as one of the other three, is a grotesque lop-sided conception possessing no sort of resemblance to a space having an extra dimension of the same kind as the three which we are now able to perceive. Moreover, a precisely similar argument might be used to disprove the existence of space of less than three dimensions; whereas it is a matter of common every-day experience to all men that such spaces actually exist.

These considerations seem to me so obvious that I am surprised that it should be necessary to point them out. I am no

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scientist. I am a mere man-in-the-street, or rather-in the jungle. I am, however, an engineer by profession; and perhaps, as such, I have had more to do in the way of measuring spaces than falls to the lot of men in other professions. I have been at it every day of my life for the last twenty and odd years. And it is possibly this extreme familiarity with the dimensions of space that has given me a more than usually vivid conception of what dimensionality really is. Moreover this is not really a question of science at all, but of philosophy—a question of pure reason—of logic—of mathematics. And that is a faculty born in man, and one in which those most renowned in scientific research are often deficient. The discovery of facts and the discovery of the necessary relationships between facts are two distinct departments. The philosopher does not concern himself with the discovery of facts. He is content to get his facts ready made from the scientist. And it would perhaps be well if scientists would leave philosophy to philosophers. In science, the rôle of the philosopher is that of the spectator, who sees most of the game.

The logical aspect of the theory of hyper-spaces is perfectly sound. Philosophy has shown conclusively that four-dimensional space may exist. The acceptance of the idea introduces no discord, no break in the continuity of our knowledge. It is not contradicted by any known scientific facts. But—whether four-dimensional space actually has any real existence has yet to be proved. That is a question of simple scientific fact. The claim of some that they have by practice actually become capable of intuiting a fourth dimension is no proof of its existence. It only proves that these people have very strong and vivid imaginations. By mathematics one might calculate to the minutest detail what a four-dimensional body would be like. And by an adequate imagination we might picture it to ourselves in the minutest detail. The novelist, Mr. Wells, has carried out a process very similar to this with regard to the hypothetic inhabitants of the moon. But scientific proof of the existence of the inhabitants of the moon, and of the fourth dimension, are at present both conspicuous by their absence.

The lines which such scientific proof must take may perhaps be roughly indicated in advance.

It must be either direct or indirect.

The direct proof would be to make the fourth dimension actually visible to us by some kind of microscope or other-scope.

The indirect way would be as follows. If there is a fourth

dimension, then certain results must follow which can be demonstrated in the three-dimensional world—then demonstrate them. For instance, if a space be completely closed as regards its three apparent dimensions, but if nevertheless there is an unapparent fourth dimension, in the direction of which it is wide open, then a solid body could be introduced into that space along that fourth dimension. Search for an instance of such a phenomenon! Some spiritualists claim to have cases on record.

Indirect evidence, however, is not conclusive, unless it can be shown that no other explanation is possible. And, trickery apart, explanations other than a fourth dimension, but perhaps no less marvelous, would, in this case, be conceivable.

W. E. AYTON WILKINSON.

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A MULTI-DIMENSIONAL SPACE CONCEPTION.

(A Translation.)

To the Editor of The Monist:

First of all I must express my thanks to you for the unusually sympathetic words with which you commented upon my new geometrical theory in the April number of *The Monist* (p. 316). For this reason I feel the more in duty bound to call your attention to one place in the review which is inaccurate because of my own fault.

After you placed an emphasis, quite rightly, upon the fact that my theory "beats Riemann's curved space and also Bolyai and Lobachevsky," you add that "even the believers in the fourth dimension must confess that they are left behind." This is evidently founded upon the oft repeated statement in my book that extended space can have not only four but even five and six dimensions but no more. But in a correction which I have added as an additional independent supplement I have corrected this statement to the effect that the supposed five- and six-dimensional octahedral space would have to be identical with the quadratic five- and six-dimensional space; and that since this last is not possible, extended space can not have more than four dimensions.

Nothing indeed has been gained in principle by this correction, for in principle only the assertion which is carried out in the book is correct, namely that extended space can not exceed a definite

number of dimensions. The believers in the fourth dimension would find themselves deceived if in their statements they were henceforth to rest upon my geometry; for although according to their principles objective space must necessarily have four dimensions if it be eternal, it follows at the same time from the same principles that this can not be the case, and that if the multi-dimensional world is eternal it could exist originally only in *n*-dimensional *unextended* space as I have pointed out in my book (pp. 264-6).

DR. BRANISLAV PETRONIEVICS.

PARIS, FRANCE.

BOOK REVIEWS AND NOTES.

A LITERARY HISTORY OF PERSIA. By Edward G. Browne. New York: Scribner, 1906. Pp. 568.

Persia with its literature, religious development and civilization is less known than it deserves to be. Though at present a state tottering under the aggressive inroads of Western civilization, it looks back upon a history of which it surely may be proud, not counting the history of ancient Persia which has originated after its acceptance of Islam. We must confess that even fairly well educated people are very little conversant with its rich literature, secular as well as religious. The only name that has come to the knowledge of the average man is perhaps that of the epic poet, Firdawsi (Firdusi). We are indebted to Professor Browne, of Oxford, England, for much that we know concerning Behaism which started in Persia under the name of Babism, and developed under the very eyes of our present irreligious generation, a new religion full of enthusiasm and filled with the spirit of martyrdom, exhibiting many phases similar to Christianity in its earliest days. To him we owe the best and most reliable information that we possess in regard to Persian language, literature and history. The present book opens to us the wealth of Persian literature from Firdawsi to Sa'di. Considering the ignorance that generally prevails on the subject it seems almost hopeless to give a sketch of its contents, for it would necessarily consist of mere names which in their foreign accent would be a sound without meaning, and so we will limit ourselves to one quotation only taken at random and selected on account of its religious significance. Among Persian poets the mystics have attained a prominent place, and among the mystic poetry there is one entitled "Mantiqu't-Tayr," which is an allegorical epic describing the quest of the birds for the mythical Simurgh. The latter typifies God, "the Truth," the spiritual aim of all aspiring souls . In the course of a discussion of the birds who make their excuses as to why they give up the pursuit of this great goal, their leader, the Hoopoe, describes the road to Simurgh, and in doing so mentions that in their search they must pass through annihilation, and they will be purged of all self and purified by their trials, yet in finding the Simurgh and losing themselves they will after all find themselves.

Professor Browne describes the passage in a literal prose translation as follows:

"Through trouble and shame the souls of these birds were reduced to utter Annihilation, while their bodies became dust.

"Being thus utterly purified of all, they all received Life from the Light of the [Divine] Presence.

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"Once again they became servants with souls renewed; once again in another way were they overwhelmed with astonishment.

"Their ancient deeds and undeeds were cleansed away and annihilated from their bosoms.

"The Sun of Propinquity shone forth from them; the souls of all of them were illuminated by its rays.

"Through the reflection of the faces of these thirty birds (si murgh) of the world they then beheld the countenance of the Simurgh.

"When they looked, that was the Simurgh: without doubt that Simurgh was those thirty birds (si murgh).

"All were bewildered with amazement, not knowing whether they were this or that.

"They perceived themselves to be naught else but the Simurgh, while the Simurgh was naught else than the thirty birds (si murgh).

"When they looked towards the Simurgh, it was indeed the Simurgh which was there:

"While, when they looked towards themselves, they were si murgh (thirty birds), and that was the Simurgh;

"And if they looked at both together, both were the Simurgh, neither more nor less.

"This one was that and that one this; the like of this hath no one heard in the world.

"All of them were plunged in amazement, and continued thinking without thought.

"Since they understood naught of any matter, without speech they made inquiry of that Presence.

"They besought the disclosure of this deep mystery, and demanded the solution of 'we-ness' and 'thou-ness."

"Without speech came the answer from that Presence, saying: 'This Sunlike Presence is a Mirror.

"Whosoever enters It sees himself in It; in It he sees body and soul, soul and body.

"Since ye came hither thirty birds (si murgh), ye appeared as thirty in this Mirror.

"Should forty or fifty birds come, they too would discover themselves.

"Though many more had been added to your numbers, ye yourselves see, and it is yourself you have looked on."

Professor Browne, in presenting the products of his labors, touches in the preface upon our narrowness and self-conceit. He insists that our form of civilization, and our modes of thought are not the only possible ones, and he would concentrate his efforts toward the broadening of our religious, material, and humanitarian ideals. The passage is so characteristic that we here reproduce his own comment on his book:

"The work itself has had my whole heart, and I would that it could also have had my undivided attention. For Islam and the Perso-Arabian civilization of Islam I have the deepest admiration; an admiration which it is especially incumbent on me to confess at a time when those are so much misunderstood and misrepresented by Europeans; who appear to imagine that they themselves have a monopoly of civilization, and a kind of divine mandate

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to impose on the whole world not only their own political institutions but their own modes of thought. Year by year, almost, the number of independent Muslim States grows less and less, while such as still remain—Persia, Turkey, Arabia, Morocco, and a few others—are even more and more overshadowed by the menace of European interference. Of course it is in part their own fault, and Asiatic indifference and apathy combine with European "earth-hunger" and lust of conquest to hasten their disintegration. To the unrereflecting Western mind the extinction of these States causes no regret, but only exhilarating thoughts of more "openings" for their children and their capital; but those few who know and love the East and its peoples, and realise how deeply we are indebted to it for most of the great spiritual ideas which give meaning and value to life, we feel, with Chesterton's "Man in Green," that with the subsidence of every such State something is lost to the world which can never be replaced."

DIE ENTWICKLUNG DER ALTCHINESISCHEN ORNAMENTIK. Von Werner von Hoerschelmann. Beiträge zur Kultur- und Universalgeschichte Herausgegeben von Karl Lamprecht. Vol. IV. Leipsic, 1907. 48 pages and 32 plates. Price, 5.40 m.

It is gratifying to see that the subject of a doctor-thesis of Leipsic has been chosen from the field of Chinese archeology, and that interest in things of Chinese antiquity seems to be growing in Germany. The principal idea of the author is to establish a series of developments in ancient Chinese ornamentation from an original geometrical state gradually leading into a more and more realistic aspect. On the whole, he is correct in this thesis, and proves it by consulting ample material drawn from the Po-ku-t'u and K'ienlung's Catalogue, the two best-known archeological productions of the Chinese. The limitation to Chinese drawings certainly has its disadvantages, as they are not always correct in regard to proportion, and in some cases do not even fully reproduce the whole of the decoration on the larger bronze vessels. This drawback is most obvious in the metal mirrors, in which the flat Chinese engraving entirely fails to bring out the relief-character of the design, and most of which are simply misdrawn. It is matter for regret that no legends are attached to the plates, and that no list of plates is given, and as an index is also lacking, it is possible only after considerable loss of time to hunt up what the author has to say about his illustrations. Nor is there, after all, a technical necessity for arranging pure line engravings on plates; they easily and naturally find their place in the text, where the reader can comfortably compare them with the description.

As the author is not familiar with Chinese, he consulted Prof. A. Conrady of the University of Leipsic, who most generously assisted him with his wide knowledge of Chinese literary and archeological subjects, and contributed many valuable notes to the paper. But without such assistance, he could have well availed himself of the bas-reliefs of the Han time, conveniently accessible through the work of Chavannes. Although we concur with the author in the general result of his industrious and interesting investigation, we are not always inclined to approve of his methods, or to agree with his opinions and evolutionary constructions of ornaments in every case. But it is impossible

to dwell on these points in the brief space of a review, as it would lead us too far away into general discussions of the whole question of ornamental development. Wundt's Völkerpsychologie is not a trustworthy or authoritative guide in this line, as the author seems to assume; and it is rather strange that the numerous researches of this subject carried on in America now for a decade, which have thoroughly revolutionized all former views, have hardly penetrated into the thoughts of Europe, except in a few ethnological circles. Such a fundamental question, for instance, as the dependence of an ornament upon the peculiar technique of the object to which it is applied,-a question much ventilated by Karl v. d. Steinen during recent years,-is not even touched upon in the present paper. The interpretation of the subject of the two prancing animals on the bronze figured on Plate XXII as being derived from a West-Asiatic or Babylonian model is not plausible. The characteristic feature of this representation is, as the author too justly emphasizes, the ornamental filling in of the two animals. This peculiar method, however, is, as S. Reinach ("La représentation du galop dans l'art ancien et moderne," extrait de la Revue Archéologique, Paris, 1901, pp. 67, 68) has correctly demonstrated, characteristic of ancient Siberian art, and widely made use of in it. From there, I should venture to think, the Chinese motive also is derived. The man in front of the horned animal outlined on the same object is a very frequent theme on the reliefs of the pottery vases of the Han dynasty, and there is no reason to suspect the exercise of any foreign influence on such a simple and primitive affair. But whatever divergences of opinion there may be, Mr. v. Hoerschelmann has undeniably furnished a useful and meritorious contribution to the history of Chinese ornaments, the study of which it is hoped will be continued by him.

DIE TIBETISCHE UEBERSETZUNG VON KALIDASAS MEGHADUTA. Nach dem roten und schwarzen Tanjur herausgegeben und ins Deutsche übertragen von Hermann Beckh. Aus dem Anhang zu den Abhandlungen der Königl. Preuss. Akademie der Wissenschaften vom Jahre 1906. Berlin, 1907. 85 pages.

EIN BEITRAG ZUR TEXTKRITIK VON KALIDASAS MEGHADUTA. Von Hermann

Beckh. Berlin, 1907. 37 pages.

With these two papers, Dr. H. Beckh introduces himself into the scientific world. The last-named he has recently presented as his thesis to the University of Berlin, and he has subjected the Tibetan translation of Kali-

dasa's Meghaduta to a most careful and minute study.

In the first treatise he gives a critical edition of the text in Tibetan characters based on a comparison of the three Tanjur copies of St. Petersburg, Berlin, and London, and accompanied by an elaborate array of critical notes. Then follows a literal translation after the Tibetan text, which is very instructive, as the author has added in parentheses many Tibetan-Sanskrit equations, and imparts full explanations of many poetical phrases and compositions, from which Tibetan lexicography will obtain a rich harvest. These results, the author promises to work up in a third paper.

In the second contribution he is engaged in the question as to what can be learned from the Tibetan version in regard to the Sanskrit text. Of primary

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importance here, of course, is an inquiry into the time when this translation was made. The epoch of the translators named in the colophon is thus far unknown, but from internal evidence the conclusion is warranted that the Tibetan Meghaduta refers to the thirteenth century A. D. most interesting results of Dr. Hermann Beckh's investigation is that the Tibetans were not acquainted with the commentary of Mallinatha. In many respects this Meghaduta translation is greatly distinguished from the usual method of the Buddhistic texts, being extraordinarily free and skilful; and the author lays stress on the understanding with which the translator has grasped, upon the whole, the thoughts of Kalidasa, and reproduced in his language the intricate style of the Mahakavya. Among the various Sanskrit editions, the Tibetan version stands nearest to that of Wilson (Calcutta, 1813), and is farthest removed from that of Mallinatha; but it cannot be looked upon as the genuine and original text of Kalidasa, as doubtless unauthentic stanzas have been received into it. The independence of the translation renders it difficult to establish confidently the Sanskrit reading which may have crossed the mind of the Tibetan. Dr. Beckh scrutinizes all cases with an almost microscopical analysis, and dwells in particular on the passages where the Tibetan version harmonizes with Wilson and the Singhalese edition against Mallinatha. Altogether the merits of the author's most thorough and painstaking work, on which he deserves hearty congratulations, can hardly be overestimated, and it is not too much to say that it presents the best that has been done for years in the line of Tibetan philology. No one who takes an interest in Kalidasa can pass by his investigation, and no student of Tibetan language and literature should neglect to work through this text with his translation and notes, which will reveal to him an entirely new and unsuspected form of this interesting idiom. We also wish to express our undisguised satisfaction at welcoming in Dr. Beckh a new worker in this woefully neglected field, and one who bids fair to advance its cause by the intelligence and quality of his work. We take the opportunity of calling his attention to the Tibetan version of Açvaghosha's Buddhacarita in the Tanjur, which would well repay a complete edition and translation. Several have begun to cope with it; the late Dr. Wenzel was the first to lay hands on it, and the late Dr. Huth kept the same plan in mind. I myself then studied a great portion of the work, when other duties called me away from it, with bare chance of the hope of resuming it, but I am convinced I do not err in cherishing the belief that Dr. Beckh is the right man for this task. B. LAUFER.

CONCEPTS OF PHILOSOPHY. By Alexander Thomas Ormond. New York: Macmillan, 1906. Pp. 722.

Professor Ormond, of Princeton University, in this voluminous book, divides his treatment in three parts. Part I, "Analysis" treats first the consciousness as knower. Consciousness itself is undefinable but knows itself in self-knowledge. Self is not picturable but is known immediately, and the cognitive activity is dependent on the emoto-volitional, though it is inseparable from it and underivative. The three modes of determining things are by mathematics, which rests on space, time and number; by physical science, which originates by qualitative change; and by metaphysics which occupies the inner rather than the outer standpoint, and approaches the nature of things

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by analogy, taking consciousness as the type of inner nature in general (page 66). Professor Ormond further treats extensively the methods in philosophy, the world of existents, and primary certitude, which latter he distinguishes from validity.

The second part is synthetical and, contrasting the mental and the physical, leads from physics to social life and to the problem of an ultimate unification, the final synthesis in which the world-movements as a whole are conceived as organized and guided by an all-comprehending Thought or Power. This idea culminates with Professor Ormond's postulate of an eternal consciousness as the bearer of purpose of the world-movements as a whole (pp. 333-5). He continues by treating of the ethical activity, the ethical synthesis, emotion and rationality, and religion. Our author further discusses the problem of origin and development, the religious synthesis and philosophical aspect of religion, the individual and the eternal, sin and retribution.

An important chapter in the third part, "Deductions," contains Professor Ormond's treatment of the idea of God (604-626), and also his treatment of the anthropological problem as to the nature of man and his freedom with reference to the character of God as absolute monarch. In a supplementary

chapter Professor Ormond says:

"We have in the foregoing discussions endeavored to work out in detail a demonstration of the truth of the claim we have made for philosophy; namely, that its central business is the unification of truth. In the course of this demonstration it has become clear, we are led to hope, that this unity is achieved from one point of view, only in a synthesis of scientific and metaphysical insights and methods, while from another point of view it is reached through a synthesis of knowledge and belief."

We further quote as characteristic of Professor Ormond's view what he has to say on consciousness and its significance which we read in the Appen-

dix:

"The doctrine of the preceding discussions is that consciousness is the great reality as well as the material which supplies the concepts and categories of the real in general. In taking this ground I do not limit consciousness to the cognitive function, or to mere awareness. It is awareness, of course, but it is much more. By consciousness I mean an activity, an energy that becomes aware of itself and its object. The fundamental and central form of consciousness, so conceived, is selfhood. In selfhood its inner nature expresses itself, and in selfhood it becomes the metaphysical subject of those categories which enable us to interpret the world in terms of its inner, and, from any other point of view, hidden nature. There seems to be, in the last analysis, just two alternative views of consciousness that can be regarded as at all rational. The one is that which conceives it as mere awareness and consequently, when logical, reduces it to the position of a mere spectator in the world. The other is the view advocated here; namely, that consciousness is an agent,-in fact the agent of agents,-revealing in its activity the truth and significance of the inner nature of things."

The book is perhaps ponderous for a layman, but the professional philosopher will find much food for thought and will be interested to gain an insight into the teachings of philosophy at Princeton by the successor of the

venerable McCosh, whose chair Professor Ormond holds.

LA EVANGELIO SANKTA MATEO lau Dro. Martin Luther. Tradukita en la lingvon internacian Esperanto, de W. B. Mielck kaj Fr. Stephan kun antauparolo de Lic. Dro. Alfred Jeremias. Leipsic: Hinrichs, 1906. Price, 50 pf.

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Dr. Alfred Jeremias, a German theologian, well known for his studies in comparative religion, has written the preface to this Esperanto translation of the Gospel of Matthew. He considers that the highest aim of this "Language of Hope" is the spread of the knowledge of Christian enlightenment throughout the world.

The inventor of Volapük, a Roman Catholic clergyman, has been celebrating of late his eightieth birthday. He has seen in his lifetime the rapid progress made by the language of his invention, and must feel some disappointment in seeing it now displaced by another similar attempt made by the Russian Zamenhof. It is not difficult to foretell that Esperanto will share the fate of Volapük. It possesses some advantages to be sure, but upon the whole is subject to the same criticism, and it takes no prophet of great sagacity to predict that it will pass away within about one generation.

As a sample of Esperanto we reprint the Lord's Prayer. The italicized c and g are written in Esperanto with an inverted double accent which is missing in our type. The italicized g is pronounced as "g" in gin, and the italicized c as "ch" in church. The insertion of these accented letters (among which are also h and j) is a typographical objection, which however could be overcome or be easily changed. For rules of the Esperanto language see the

editor's notes in The Monist, XVI, p. 450.

"Patro nia en la cielo. Via nomo estu sanktigata. Via regno venu. Via volo farigu sur la tero, kiel en la cielo. Nian panon ciutagan donu al ni hodiau. Kaj pardonu al ni niajn kulpojn, kiel ni pardonas al niaj kulpuloj. Kaj ne konduku nin en tenton, sed savu nin de la malbono. Car via estas la regno, kaj la forto, kaj la gloro en eterneco. Amen."

AN OUTLINE OF THE IDEALISTIC CONSTRUCTION OF EXPERIENCE. By J. B. Baillie. London: Macmillan, 1906. Pp. 344. Price, \$2.75 net.

Professor Baillie of the University of Aberdeen, in Scotland, known in the philosophical world as the author of $Hegel's\ Logic$, here presents us with an outline of his own "idealistic construction of experience." He yields to the modern scientific tendency so much as to recognize experience, but sees in the construction which the mind has to make of the data of experience the most essential part of philosophy. The truths of common sense or science are valid so far as they go, but are one-sided in character. Our author explains in this book how far they are so. He insists that experience is a living process and sums up the demands of philosophy thus:

"A complete idealistic explanation of experience ought therefore to show (1) that each phase of experience embodies in a specific way the one spiritual principle animating all; (2) that each is distinct from every other simply by the way it embodies that principle; (3) that each is connected with the others and so with the whole in virtue of its realizing that principle with a certain degree of completeness; (4) that the whole of experience is a necessary evolution of the one principle of experience through various forms,

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logically connected as a series of stages manifesting a single principle from beginning to end. Such an explanation must have the character of developmental construction. The attempt is made in the following chapters to ex-

pound the idealistic argument from this point of view."

After an introduction in which he discusses the idea of validity and fact and kindred subjects, the book treats the following topics: Dualism and the New Problem, Truth and Experience, Plan and Stages of the Argument, The Interpretation of Sense-Experience, and of Perceptual Experience, Understanding and the World of Noumena and Phenomena, Self-Conscious Experience, The Sphere of Reason-Scientific Experience, The Sphere of Finite Spirit—Moral Experience, The Sphere of Absolute Spirit—Religious Experience and Contemplation.

The religious problem receives the full attention of our author, and he discusses the three spiritual factors of revealed religion in faith, hope and love, but in addition he would give to contemplation a recognized place. Near

the end of the book he says:

UEBER DIE VERERBUNG ERWORBENER EIGENSCHAFTEN. Hypothese einer Zentroepigenese. Von Eugenio Rignano. Leipsic: Engelmann, 1907. Pages

399. Price, paper, 5 m.

The subject of heredity of acquired characteristics becomes of vital interest not only in the technical study of biology but in the broader fields of scientific philosophy in general, because of its universality and its bearing on the development of races and even sociology as well. Mr. Rignano has made use of the wealth of material furnished by biologists and naturalists for the purpose of throwing some light on this question which constantly evades solution and in which as a scientific man, though not a specialist, he is vitally interested. In his earliest philosophical and sociological investigations he was inclined to favor Weismann's theory of non-heredity of acquired characteristics although he had formed no distinct opinion on the subject, but he never lost sight of the fact that natural selection was not sufficient to completely explain phylogenetic evolution, and was always convinced that non-heredity was contrary to the biogenetic hypothesis at which he finally arrived by induction. He realizes that in the present transitional state of biological science all that can be expected of any hypothesis is to turn the line of research into a somewhat different channel, and this he believes is accomplished by this new

biogenetic hypothesis which he herewith submits to the judgment of biologists and positivistic philosophers alike. The first chapter describes briefly the inductive method used by the author to arrive at his hypothesis from the principle of biogenesis. In the next three chapters are gathered together systematically in as compact a form as possible all the facts which best explain and demonstrate the new hypothesis confirming it directly or indirectly by deduction. After briefly considering in the fifth chapter the question of the heredity or non-heredity of acquired characteristics, the sixth chapter discusses critically the most important theories of biogenesis which are held to-day, not only to show its inadequacy but much rather in order that the knowledge of the principles of this inadequacy might contribute to the discovery of the necessary conditions which every theory requires and which this heredity is thought to explain. In the seventh chapter the author enters upon the demonstration of his hypothesis which up to this time had given place to the discussion of the reality and unreality of the heredity of acquired characteristics. Finally in the last chapter he undertakes to represent how this elementary hypothesis upon which the new biogenetic theory is based, explains memory as well as the most important characteristics of the phenomena of life in general. Therefore he considers that this elementary hypothetical phenomenon comprehends within itself, not only biogenetic phenomena, but even all phenomena of life in the broadest sense of the word, and refers them to a single point of departure. Because the heredity of acquired characteristics is one of the most vital questions of positive philosophy in Comte's sense, or of scientific philosophy, the author flatters himself that he will not be considered as an interloper by biologists and naturalists, and expresses himself as hoping that he may count upon their forbearance in consideration of the great difficulties which he had to encounter in a line wherein he was no specialist, although he himself is particularly aware of the many shortcomings of his work.

L'INDIVIDU L'ASSOCIATION ET L'ÉTAT. Par Eugène Fournière. Paris: Alcan, 1907. Pp. 260. Price, 6 fr. bound.

In this new work the author of An Essay on Individualism, assisted by a careful study of documents and records, undertakes to prove that in modern society, association is the only means of liberty for the individual as it is the only means of equality between individuals. He proves by numerous and decisive facts that democracy is brought about by association, and is also transformed by it in depriving tyranny of all the evil characteristics with which it may be reproached. According to the author socialism, too, is modified to an important extent by this phenomenon, gaining strength by association not only in its modes of activity but even more perhaps in its teachings.

Hugo De

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Extract from a letter to Professor De Vries by Dr. Hjalmar Nilsson of the Swedish Agricultural Experiment Station at Svalof.

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ion of Reada Pretion.- By Paul Carus. 80 illustrations. Pp. 183. Comprehensive index. Boards, \$1.00 net. (4s. 6d. net.)

Dr. Carus contends that Samson's prototype is to be found in those traditions of all primitive historical peoples which relate to a solar deity. He believes that genuine tradition, no matter how mythological, is more conservative than is at first apparent. Though the biblical account of Samson's deeds, like the twelve labors of Heracles, is the echo of an ancient solar epic which glorifies the deeds of Shamash in his migration through the twelve signs of the zodiac, there may have been a Hebrew hero whose deeds reminded the Israelites of Shamash, and so his adventures were told with modifications which naturally made the solar legends cluster about his personality.

References are fully given, authorities quoted and comparisons are carefully drawn between Samson on the one hand, and Heracles, Shamash, Melkarth and Siegfried on the other. The appendix contains a controversy between Mr. Geo. W. Shaw and the author in which is discussed at some length the relation between myth and history.

Chinese Thought An Exposition of the Main Characteristic Features of the Chinese World-

Conception. By Paul Carus. Being a continuation of the author's essay, Chinese Philosophy. Illustrated. Index. Pp. 195. \$1.00 net. (4s. 6d.)

This book contains much that is of very great interest in the development of Chinese culture. Beginning in the first chapter with a study of the earliest modes of thought-communication among primitive people of different parts of the world, and tracing the growth of the present system of Chinese caligraphy. In "Chinese Occultism" some interesting Oriental mystical ideas are explained as well as the popular methods of divination by means of trigrams and the geomancer's compass. In a special chapter the zodiacs of different nations are compared with reference to the Chinese zodiac and also to a possible common Babylonian origin. This chapter contains many rare and valuable illustrations representing almost all known zodiacs from those of Egypt to the natives of the Western hemisphere. The influence of Confucius is discussed, and a hurried recapitulation of the most important points in Chinese history is given together with a review of the long novel which stands in the place of a national epic. Chinese characteristics and social conditions have their place in this volume as well as the part played in China by Christian missions, and the introduction of Western commercialism. The author's object is to furnish the necessary material for a psychological appreciation of the Chinese by sketching the main characteristic features of the ideas which dominate Chinese thought and inspire Chinese morality, hoping thereby to contribute a little toward the realization of peace and good will upon earth.

Chinese Life and Customs By Paul Carus. With illustrations

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Yin Chih Wen, The Tract of the Quiet Way. With Extracts from the Chinese commentary. Translated by Teitaro Suzuki and Dr. Paul Carus. 1906. Pp. 48. 25c net.

This is a collection of moral injunctions which, among the Chinese is second perhaps only to the Kan-Ying Pien in popularity, and yet so far as is known to the publishers this is the first translation that has been made into any Occidental language. It is now issued as a companion to the T'ai-Shang Kan-Ying P'ien, although it does not contain either a facsimile of the text or its verbatim translation. The original consists of the short tract itself which is here presented, of glosses added by commentators, which form a larger part of the book, and finally a number of stories similar to those appended to the Kan-Ying Pien, which last, however, it has not seemed worth while to include in this version. The translator's notes are of value in justifying cerwhile to include in this version. The translator shotes are of value in justifying that tain readings and explaining allusions, and the book is provided with an index. The frontispiece, an artistic outline drawing by Shen Chin-Ching, represents Wen Ch'ang, one of the highest divinities of China, revealing himself to the author of the tract. The motive of the tract is that of practical morality. The maxims give definite instructions in regard to details of man's relation to society, besides more general com-

mands of universal ethical significance, such as "Live in concord," "Forgive malice, "Do not assert with your mouth what your heart denies."



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